Santa Clara Valley Water District

UWMP 2005

Urban Water Management Plan 2005

Appendices

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Appendix A

Resolution No. 05-72 – Resolution to Adopt the Santa Clara Valley Water District 2005 Urban Water Management Plan

RESOLUTION NO. 05- 72

RESOLUTION OF THE BOARD OF DIRECTORS OF THE
SANTA CLARA VALLEY WATER DISTRICT ADOPTING THE
2005 URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Legislature enacted the Urban Water Management Planning Act mandating suppliers of water for municipal purposes to more than 3,000 customers to prepare an Urban Water Management Plan; and

WHEREAS, the District is a wholesale supplier of water to retailers, businesses, and residents in Santa Clara County; and

WHEREAS, the District first prepared an Urban Water Management Plan in 1985 with updates in 1990, 1995, and 2001; and

WHEREAS, the Urban Water Management Plan must be reviewed at least once every five years, and the District must make any amendments or changes to its plan which are indicated by the review; and

WHEREAS, the District has prepared and circulated for public review a draft Urban Water Management Plan, and properly noticed a public hearing regarding said Plan held by the Board of Directors on November 15, 2005 and December 20, 2005; and

WHEREAS, the District Board of Directors considered the Urban Water Management Plan on December 20, 2005;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Santa Clara Valley Water District:

1. The 2005 Urban Water Management Plan is hereby adopted and ordered filed with the Clerk of the Board;

2. The CEO is hereby authorized and directed to file the 2005 Urban Water Management Plan with the California Department of Water Resources, the California State Library, the County of Santa Clara, local cities and towns, and water retailers within 30 days of adoption as described in Section 10644(a) of the California Water Code;

3. The CEO is hereby authorized and directed to implement the 2005 Urban Water Management Plan in accordance with the Urban Water Management Plan Act.

PASSED AND ADOPTED by the Board of Directors of Santa Clara Valley Water District by the following vote on December 20, 2005:

AYES: Directors G. Zlotnick, J. Judge, R. Kamei, S. Sanchez, L. Wilson, R. Santos

NOES: Directors None

ABSENT: Directors T. Estremera

ABSTAIN: Directors None

ATTEST: LAUREN L. KELLER

Lauren L. Keller
Clerk/Board of Directors

SANTA CLARA VALLEY WATER DISTRICT

By: Richard P. Santos
RICHARD P. SANTOS
Chair/Board of Directors

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Appendix B

UWMP Act Legislation

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384, Costa, 2002
SB 1518, Torlakson, 2002
AB 105, Wiggins, 2004
SB 318, Alpert, 2004

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in

its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS
Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.

(M) Water waste prohibition.

(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council

in accordance with the ‘‘Memorandum of Understanding Regarding Urban Water Conservation in California,’’ dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

(k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier’s plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including,

but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5 Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the

plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

Appendix C

District Act

Santa Clara Valley Water District Act

An act to create a flood control District to be called Santa Clara County Flood Control and Water District; to provide for the control and conservation of flood and storm waters and the protection of watercourses, watersheds, public highways, life and property from damage or destruction from such waters; to provide for the acquisition, retention, and reclaiming of drainage, storm, flood, and other waters and to save, conserve, and distribute such waters for beneficial use in said District; to authorize the incurring of indebtedness, the issuance and sale of bonds, and the levying and collection of taxes and assessments on property within said District and in the respective zones thereof; to define the powers of said District; to provide for the government, management, and operation of said District and for the acquisition and construction of property and works to carry out the purposes of the District, declaring the urgency thereof, to take effect immediately. The name of the Santa Clara County Flood Control and Water District Act was changed to the Santa Clara Valley Water District.

§ 1. Short title

Sec. 1. This act shall be known and may be cited as the Santa Clara Valley Water District Act.

§ 2. Creation; name of District; boundaries; District.

Sec. 2. A flood control and water District is hereby created to be called the Santa Clara Valley Water District. S aid District shall consist of all the territory of the County of Santa Clara lying within the exterior boundaries of said county. As used in this act, "District'' means the Santa Clara Valley Water District.

§ 3. Zones; establishment; change of boundaries

Sec. 3. The board of the District created by this act, by resolutions thereof adopted from time to time, may establish zones within said District without reference to the boundaries of other zones, setting forth in such resolutions descriptions thereof by metes and bounds and entitling each of such zones by a zone number, and institute zone projects for the specific benefit of such zones. The board may, by resolution, amend the boundaries by annexing property to or by withdrawing property from said zones or may divide existing zones into two or more zones or may super-impose a new or amended zone on zones already in existence, setting forth in such resolutions descriptions of the amended, divided or superimposed zones by metes and bounds and entitling each of such zones by a zone number.

Proceedings for the establishment of such zones may be conducted concurrently with and as a part of proceedings for the instituting of projects relating to such zones, which proceedings shall be instituted in the manner prescribed in Section 12 of this act.

§ 4. Objects and purposes

Sec. 4. The objects and purposes of this act are to authorize the District to provide comprehensive water management for all beneficial uses and protection from flooding within Santa Clara County. The District may take action to carry out all of the following purposes:

(a) to protect Santa Clara County from flood and storm waters of the District, including tidal flood waters and the flood and storm waters of streams that have their sources outside the District, but flow into the District; (b) to protect from those flood or storm waters the public highways, life and property in the District, and the watercourses and watersheds of streams flowing within the District; (c) to provide for the conservation and management of flood, storm, reclaimed, or recycled waters, or other waters from any sources within or outside the watershed in which the District is located for beneficial and useful purposes, including spreading, storing, retaining, and causing the waters to percolate into the soil within the District; (d) to protect, save, store, recycle, distribute, transfer, exchange, manage, and conserve in any manner any of the waters; (e) to increase, and prevent the waste or diminution of, the water supply in the District; (f) to obtain, retain, reclaim, protect, and recycle drainage, storm, flood waters or treated wastewaters, or other waters from any sources, within or outside the watershed in which the District is located for any beneficial uses within the District; (g) and to enhance, protect, and restore streams, riparian corridors, and natural resources in connection with carrying out the objects and purposes set forth in this section.

§ 5. Nature of District; powers

Sec. 5. The District is hereby declared to be a body corporate and politic and, in addition to other powers granted by this act, may take action to carry out all of the following purposes:

1. To have perpetual succession.

2. To sue and be sued in the name of the District in all actions and proceedings in all courts and tribunals of competent jurisdiction.

3. To adopt a seal and alter it at pleasure.

4. To acquire by grant, purchase, lease, gift, devise, contract, construction, or otherwise, and to hold, use, enjoy, sell, let, and dispose of real and personal property of every kind, including lands, structures, buildings, rights-of-way, easements, and privileges, and to construct, maintain, alter and operate any and all works or improvements, within or outside the District, necessary or proper to carry out any of the objects or purposes of this act and convenient to the full exercise of its powers, and to complete, extend, add to, alter, remove, repair or otherwise improve any works, or improvements, or property acquired by it as authorized by this act.

5. To store water in surface or underground reservoirs within or outside of the District for the common benefit of the District or of any zone or zones affected; to conserve reclaim, recycle, distribute, store, and manage water for present and future use within the District; to appropriate and acquire water and water rights, and import water into the District and to conserve within or outside the District, water for any purpose useful to the District; and to do any and every lawful act necessary to be done that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the District, including but not limited to, the acquisition, storage and distribution of water for irrigation, domestic, fire protection, municipal, commercial, industrial, environmental, and all other beneficial uses; to distribute, sell, or otherwise dispose of, outside the District, any waters not needed for beneficial uses within the District; to commence, maintain, intervene in, defend or compromise, in the name of the District in behalf of the landowners therein, or otherwise, and to assume the costs and expenses of any action or proceeding involving or affecting the ownership or use of waters or water rights within or outside the District, used or useful for any purpose of the District or of common benefit to any land situated therein, or involving the wasteful use of water therein; to commence, maintain, intervene in, defend and compromise and to assume the cost and expenses of any and all actions and proceedings now or hereafter begun; to prevent interference with or diminution of, or to declare rights in the natural flow of any stream or surface or subterranean supply of water used or useful for any purpose of the District or of common benefit to the lands within the District or to its inhabitants; to prevent unlawful exportation of water from the District; to prevent contamination, pollution or otherwise rendering unfit for beneficial use the surface for subsurface water used or useful in the District, and to commence, maintain and defend actions and proceedings to prevent any such interference with the described waters as may endanger or damage the inhabitants, lands, or use of water in, or flowing into, the District; provided, however, that the District shall not have power to intervene or take part in, or to pay the costs or expenses of, actions or controversies between the owners of lands or water rights that do not affect the interests of the District.

6. To control the flood and storm waters of the District and the flood and storm waters of streams that have their sources outside of the District, but which streams and the floodwaters thereof, flow into said District, and to conserve such waters for beneficial and useful purposes of the District by spreading, storing, retaining and causing to percolate into the soil within or without the District, or to save or conserve in any manner all or any of those waters and protect from damage from those flood or storm waters the watercourses, watersheds, public highways, life and property in the District, and the watercourses outside of the District of streams flowing into the District.

7. To enter upon any land, to make surveys and locate the necessary works of improvement and the lines for channels, conduits, canals, pipelines, roadways and other rights-of-way; to acquire by purchase, lease, contract, gift, devise, or other legal means all lands and water and water rights and other property necessary or convenient for the construction, use, supply, maintenance, repair and improvement of the works, including works constructed and being constructed by private owners, lands for reservoirs for storage of necessary water, and all necessary appurtenances, and also where necessary or convenient to that end, and for those purposes and uses, to acquire and to hold in the name of the state, the capital stock of any mutual water company or corporation, domestic or foreign, owning water or water rights, canals, waterworks, franchises, concessions, or rights, when the ownership of such stock is necessary to secure a water supply required by the District or any part thereof, upon the condition that when holding such stock, the District shall be entitled to all the rights, powers and privileges, and shall be subject to all the obligations and liabilities conferred or imposed by law upon other holders of such stock in the same company; to cooperate with, act in conjunction with, enter into and to do any acts necessary for the proper performance of any agreement with the State of California, or any of its engineers, officers, boards, commissions, departments, or agencies, or with the government of the United States, or any of its engineers, officers, boards, commissions, departments, or agencies or with any state, city and county, city, county, District of any kind, public or private corporation, association, firm or individual, or any number of them, for the ownership, joint acquisition, leasing, disposition, use, management, construction, installation, extension, maintenance, repair, or operation of any rights, works, or other property of a kind which might lawfully be acquired or owned by the District or for the lawful performance of any power or purpose of the District provided for in this act including, but not limited to, the granting of the right to the use of any water or the right to store that water in any reservoir of the District or to carrying that water through any tunnel, canal, ditch or conduit of the District or for the delivery, sale, or exchange of any water right, water supply or water pumped, stored, appropriated or otherwise acquired or secured for the use of the District, or for controlling drainage waters, or flood or storm waters of streams in or running into the District, or for the protection of life or property therein, or for the purpose of conserving any waters for the beneficial use within the District, or in any other works, uses, or purposes provided for in this act; and to adopt and carry out any definite plan or system for accomplishing,

facilitating or financing all work which may lawfully be accomplished by the District and to enforce that plan or system by resolution or ordinance.

8. To carry on technical and other necessary investigations, make measurements, collect data, make analyses, studies, and inspections pertaining to water supply, water rights, control of flood and storm waters, and use of water both within and outside the District relating to watercourses or streams flowing in or into the District. For such purposes, the District shall have the right of access through its authorized representatives to all properties within the District and elsewhere relating to watercourses and streams flowing in or into said District. The District, through its authorized representatives, may enter upon such lands and make examinations, surveys, and maps thereof.

9. To prescribe, revise and collect fees and charges for facilities furnished or to be furnished to any new building, improvement or structure by the use of any flood control or storm drainage system constructed or to be constructed in a zone of the District, and whenever a drainage or flood control problem is referred to the District by the County of Santa Clara, or any incorporated city therein, to require the installation of drainage or flood control improvements necessary and/or convenient for needs of commercial and industrial drainage and flood control needs, those county and cities being hereby authorized to refer all drainage and control problems, arising under the Subdivision Map Act (Division 2 (commencing with Section 66410) of Title 7 of the Government Code) or otherwise, to the District for solution. Revenues derived under this section shall be used for the acquisition, construction, reconstruction, maintenance and operation of the flood control or storm drainage facilities of the that zone, to reduce the principal or interest of any bonded indebtedness thereof, or to replace funds expended on behalf of that zone derived from the fund created pursuant to subdivision 1 of Section 13.

10. To incur indebtedness, and to issue bonds in accordance with this act.

11. To cause taxes or assessments to be levied and collected for the purpose of paying any obligation of the District, and to carry out any of the purposes of this act, in the manner hereinafter provided.

12. To make contracts, and to employ labor, and to do all acts necessary for the full exercise of all powers vested in the District or any of the officers thereof, by this act.

13. To have the power and right to disseminate information concerning the rights, properties, activities, plans and proposals of the District; provided, however, that expenditures during any fiscal year for those purposes shall not exceed one-half cent ($0.005) for each one hundred dollars ($100) of assessed valuation of such District.

14. To pay to any city, public agency, District, or educational institution recognized under Chapter 3 (commencing with Section 94301) of Part 59 of the Education Code, a portion of the cost of water imported by that city, public agency, District, or educational institution into, for use within, and of benefit to the Santa Clara Valley Water District.

15. To establish designated floodways in accordance with the Cobey-Alquist Flood Plain Management Act (Chapter 4 (commencing with Section 8400) of Part 2 of Division 5 of the Water Code).

16. To acquire, construct, maintain, operate and install landscaping or recreational facilities in connection with any dam, reservoir, or other works owned or controlled by the District.

17. To acquire, construct, maintain, operate and install, lease, and control facilities for the generation, transmission, distribution, sale, exchange, and lease of electric power.

18. To require the sealing of abandoned or unused wells according to standards adopted by the board by ordinance and designed to protect the groundwater resources of the District from contamination. Upon and following the effective date of the ordinance, the County of Santa Clara or any incorporated city therein shall require all persons applying for any land development permit or approval to show the existence and location of any water well upon a map of the property the subject of the application. When a well is shown, the map shall be referred to the District immediately upon receipt for review and investigation. If upon review and investigation the District determines that the well or wells are to be sealed by the applicant pursuant to the ordinance, the determination shall be transmitted promptly to the applicant by the District as a requirement in writing.

§ 6. Eminent domain

Sec. 6. The District may exercise the right of eminent domain, either within or without said District, to take any property necessary to carry out any of the objects or purposes of this act. The District in exercising such power shall in addition to the damage for the taking, injury, or destruction of property, also pay the cost of removal or relocation of any structure, railways, mains, pipes, conduits, wires, cable, poles, of any public utility which is required to be moved to a new location. Nothing in this act contained shall be deemed to authorize said District, or any person or persons to divert the waters of any river, creek, stream, irrigation system, canal

or ditch, from its channel, to the detriment of any person, or persons having any interest in such river, creek, stream, irrigation system, canal or ditch, or the waters thereof or therein, unless compensation therefore be first provided in the manner provided by law.

Nothing in this act shall authorize the District to condemn any of the properties, structures or works, now owned or hereafter to be constructed or acquired, by any water conservation District within the County of Santa Clara.

§ 6.1. Water Contamination hazard; public nuisance; standards; notice to property owner to abate; hearing; clearance letter or recordation; order to abate; abatement by District; payment of costs by owner; notice of lien; recordation; effect

Sec. 6.1. Any abandoned or unused water well endangering the public health and safety by creating a water contamination hazard is a public nuisance. The board shall, by ordinance, establish standards for what constitutes a water contamination hazard.

Whenever the District determines that a public nuisance, as so defined, exists, it shall, by certified mail, notify the then current record owner of the property to abate the public nuisance and that it is the intention of the District to record a notice of violation of the ordinance. The notice to the owner shall describe the violation and specify a time, date, and place for a hearing, at which the owner may present evidence to the board that a public nuisance does not actually exist and that the notice should not be recorded. The notice to the owner shall state that, unless the public nuisance is abated within the time specified by the board following the hearing, the District may abate the public nuisance and the costs of the abatement will be assessed against the property. The meeting shall take place no sooner than 30 days and no later than 60 days from date of mailing. If, within 15 days of receipt of the notice, the owner of the real property fails to inform the District of his or her objection to recording the notice of violation, the board shall record the notice of violation with the county recorder. If, after the owner has presented evidence, it is determined that there has been no violation, the District shall mail a clearance letter to the then current owner of record. If, however, after the owner has presented evidence, the board determines that a violation has in fact occurred, the board shall record the notice of violation with the county recorder. The notice of violation, when recorded, shall be deemed to be constructive notice of the violation to all successors in interest in the property. The county recorder shall index the names of the fee owners in the general index.

If the board determines, at the conclusion of the hearing, that a public nuisance actually exists, the board shall order the property owner to abate the public nuisance within a specified time.

If the public nuisance is not abated within the time specified in the order of the board following a hearing, the District may abate the public nuisance. Any entry upon private property by the District for this purpose shall be preceded by written notice to the owner by certified mail stating the date and place of entry, the purpose thereof, and the number of persons entering. If the mailed notice is returned undelivered, the District may post a copy thereof at the proposed entry point five days prior to entry.

Any costs incurred by the District in abating a public nuisance pursuant to this section are a lien upon the property upon which the public nuisance existed when notice of the lien is filed and recorded.

Notice of the lien, particularly identifying the property on which the nuisance was abated and the amount of the lien, and naming the owner of record of the property, shall be recorded by the District in the office of the Santa Clara County Recorder within one year after the first item of expenditures by the District or within 90 days after the completion of the work, whichever first occurs. Upon recordation of the notice of lien, the lien shall have the same force, effect, and priority as a judgment lien, except that it shall attach only to the property described in the notice, and shall continue for 10 years from the time of recording of the notice unless sooner released or otherwise discharged.

§ 7. Board of directors; term; definition

Sec. 7. The board of directors shall consist of seven members. Five members shall be elected, one from each of the five county supervisorial Districts. Two members shall be appointed by the Board of Supervisors of Santa Clara County representing the District at large. The term of office of directors shall be four years. The directors shall hold office until their successors shall be elected or appointed and qualified. As used elsewhere in this act, the terms board" and “board of directors" mean the board of directors of the Santa Clara Valley Water District.

§ 7.1. Elected members of board; nomination and election; eligibility; recall

Sec. 7.1. Each of the five elected members shall be nominated and elected by the electors of the supervisorial District which he represents at the times and in the manner provided by general law for the election of county supervisors. Elected directors from the second, third, and fifth supervisorial Districts shall be first elected at the general election held in 1968. Elected directors from the first and fourth Districts shall be first elected at the general election in 1970. At each general election thereafter, either three or two directors, as the case may be, shall be elected. The term of office shall begin at noon on the first Monday in January following the election period. In order to be eligible for election or appointment each director must be a qualified elector in the District he

represents, and must continue to reside therein during his incumbency in office provided however no change in boundaries of a supervisorial District shall affect the term of office of any director. Every member of the board, whether elected or appointed, may be recalled by the voters in accordance with the recall provisions of Chapter 2 (commencing with Section 27200) of Division 14 of the Elections Code applicable to officers of counties.

§ 7.2. Appointed directors; qualifications; terms

Sec. 7.2. The two appointed directors shall represent the District at large, but one appointed director shall have been a qualified elector for a period of at least two years immediately preceding his or her appointment in that portion of the District which consisted of the area of the Gavilan Water Conservation District on November 8, 1967. The other appointed director shall have been a qualified elector in that portion of the District which consisted of the area of the Santa Clara Valley Water Conservation District on November 8, 1967. Each appointed director shall continue to reside within the area from which the director was appointed during his or her incumbency in office.

The first term of office of the appointed director residing in the area of the Santa Clara Valley Water Conservation District shall terminate on the first Monday in January of the first even-numbered year following his or her appointment, and first term of office of the director residing in the area of the Gavilan Water Conservation District shall terminate on the first Monday in January of the second even-numbered year following his or her appointment.

§ 7.3. Vacancies in office

Sec. 7.3. Whenever a vacancy occurs in the office of an elected director, such vacancy shall be filled by appointment by the board of directors of a qualified elector from the District in which the vacancy occurs. If such an appointment is not made within 30 days from the occurrence of such vacancy, the Board of Supervisors of Santa Clara County shall make the appointment. An appointee shall hold office until the election and qualification of his successor. At the next general election following any vacancy, a director shall be elected for the unexpired term of such office unless such term is to expire on the first Monday in January of the year succeeding such general election.

Whenever a vacancy occurs in the office of an appointed director, such vacancy shall be filled by appointment by the Board of Supervisors of Santa Clara County of a qualified elector from the area in which the vacancy occurs for the unexpired term of such office.

§ 7.4. First board of directors

Sec. 7.4. The first board of directors shall be appointed by the Board of Supervisors of the County of Santa Clara. Seven directors shall be appointed, one from each of the five county supervisorial Districts and one from each of the two areas described in Section 7.2 of this act. The directors appointed shall meet the qualifications for director set forth in Section 7.1 and 7.2 of this act. The first board of directors shall hold office until their successors shall be elected or appointed and qualified.

§ 8. Officers

Sec. 8. The offices of the District attorney, county counsel, county surveyor, county assessor, county tax collector, county auditor or controller, county registrar of voters, and county treasurer of the County of Santa Clara shall be ex officio offices of the District and all officers, their assistants, deputies, clerks, and employees of such offices shall respectively perform, unless otherwise provided by the board, the same various duties for the District as for said County of Santa Clara, in order to carry out the provisions of this act. The County of Santa Clara and the District may also enter into agreements whereby said county provides additional services to the District or the District provides services to said county.

§ 9. Ordinances and resolution; rules and regulations; officers and employees

Sec. 9. The board shall have power to adopt resolutions for the District which shall be adopted, certified to, recorded, and published, in the same manner expect as herein otherwise provided for, as are resolutions for the County of Santa Clara.

The board shall have the power to adopt ordinances for the District. All ordinances shall be enacted only by roll call vote entered into the proceedings of the board. An ordinance shall be in full force and effect 30 days after adoption, and shall be published once in full in a newspaper of general circulation, printed, published, and circulated in the District within 10 days after adoption. It is a misdemeanor for any person to violate any District ordinance adopted pursuant to this section from and after the effective date of the ordinance. The violation shall be punishable by a fine not exceeding five hundred dollars ($500), or imprisonment in the county jail not to exceed 30 days, or both that fine and that imprisonment. Any violation or threatened violation may also be enjoined by civil action. The board shall have power to make and enforce all needful rules, regulations, standards, and procedures for the

administration and government of the District, and to appoint and employ all needful agents, superintendents, engineers, attorneys, and employees to properly look after all the performance of any work provided for in this act and to operate and maintain those works, and to perform all other acts necessary or proper to accomplish the purposes of this act.

In addition to the officers and employees herein otherwise prescribed, the board may in its discretion appoint a chairman, a clerk and such other officers and employees for the board or District as in its judgment may be deemed necessary, prescribe their duties and fix their compensation. Those officers and employees shall be employed, suspended, or their employment terminated in accordance with an ordinance setting forth rules, regulations, standards and procedures for appointment, suspension and termination of employment.

§ 10. Engineers; plans for projects; reports; cost estimates; removal

Sec. 10. The board shall have jurisdiction and power to employ competent registered civil engineers to investigate and carefully devise a plan or plans for a project, and to obtain such information in regard thereto, as may be deemed necessary or useful for carrying out the purposes of this act; and the board may direct such engineer or engineers to make and file reports from time to time with the board, which shall show:

1. A general description of the project, together with general plans, profiles, cross-sections, and general specifications relating thereto, on each project.

2. A general description of the lands, rights of way, easements and property proposed to be taken, acquired or injured in carrying out said project.

3. A map or maps which shall show the location and zones, as may be required, of each of said projects, and lands, rights of way, easements and property to be taken, acquired or injured in carrying out said project, and any other information in regard to the same that may be deemed necessary or useful.

4. An estimate of the cost of each project, including a statement of the portion, if any, of such cost theretofore advanced by the District for said project for which the District proposes to reimburse itself from the proceeds of sale of any bonds to be issued to pay for said project and an estimate of the cost of lands, rights of way, easements and property proposed to be taken, acquired or injured in carrying out said project, and also of all incidental expenses likely to be incurred in connection therewith, including legal, clerical, engineering, superintendence, inspection, printing and advertising, and, if deemed advisable, a sum sufficient to pay interest on any bonds proposed to be issued during all or any part of the period of construction of said project and for not to exceed 12 months thereafter; and the total amount of bonds, if any, necessary to be issued to pay for said project.

Such engineer or engineers shall from time to time and as directed by the board file with the board supplementary, amendatory and additional reports and recommendations, as necessity and convenience may require.

Such engineer or engineers, employed by the board, shall have power and authority, subject to the control and direction of the board, to employ such engineers, surveyors, and others, as may be required for making all surveys or doing any other work necessary for the making of any such report.

The board may at any time remove any or all of the engineers or employees appointed or employed under this act, and may fill any vacancies occurring among them from any cause.

§ 11. Selection of projects; determination of benefits

Sec. 11. The board shall determine which projects or works of improvement shall be carried out and shall determine, as to each project or work of improvement that it is either:

1. For the common benefit of the District as a whole; or

2. For the common benefit of two or more zones hereinafter referred to as participating zones; or

3. For the benefit of a single zone.

§ 12. Institution of zone or joint zone projects; hearing; determination; majority protest

Sec. 12. The board may institute projects for single zones and joint projects for two or more zones, for the financing, constructing, maintaining, operating, extending, repairing or otherwise improving any work or improvement of common benefit to such zone or participating zones. For the purpose of acquiring authority to proceed with any such project, the board shall adopt a resolution

specifying its intention to undertake such project, together with the engineering estimates of the cost of same to be borne by the particular zones or participating zones and fixing a time and place for public hearing of said resolution and which shall refer to a map or maps showing the general location and general construction of said project. Notice of such hearings shall be given by publication once a week for two consecutive weeks prior to said hearing, the last publication of which notice must be at least seven (7) days before said hearing, in a newspaper of general circulation designated by the board, circulated in such zone or each of said participating zones, if there be such newspaper, and if there be no such newspaper then by posting notice for two consecutive weeks prior to said hearing in five public places designated by the board, in such zone or in each of said participating zones. Said notice must designate a public place in such zone or in each of said participating zones where a copy or copies of the map or maps for said joint project may be seen by any interested person; said map must be posted in each of said public places so designated in said notice at least two weeks prior to said hearing.

At the time and place fixed for the hearing, or at any time to which said hearing may be continued, the board shall consider all written and oral objections to the proposed project. Upon the conclusion of the hearing the board may abandon the proposed project or proceed with the same, unless prior to the conclusion of said hearing written protests against the proposed project signed by a majority in number of the registered voters residing within such zone or participating zones be filed with the board, in which event further proceedings relating to such project must be suspended for not less than six months following the date of the conclusion of said hearing, or said proceeding may be abandoned in the discretion of the board.

§ 12.5. Advisory boards, committees or commissions

Sec. 12.5. The board may create by resolution such advisory boards, committees, or commissions for the District or any zone therein as in its judgment are required to serve the best interests of said District or zones, and may grant to them such duties as are consistent with the provisions of this act. The number of members of any such board, committee, or commission shall be not less than three (3) and shall be specified in the resolution. Members thereof shall serve at the pleasure of the board. The board shall create an advisory committee consisting of farmers to represent users of agricultural water.

§ 13. Taxation

Sec. 13. The board shall have the power, in any year:

1. To levy ad valorem taxes or assessments in the District, to pay the general administrative costs and expenses, including maintenance and operation of established works, of the District, to carry out any of the objects or purposes of this act of common benefit to the District, and to provide a fund which may be used by the District to pay the costs and expenses of constructing or extending any or all works established within or on behalf of a zone or participating zones within the District; provided , that funds so used are replaced from funds derived from either of the following sources:

(a) Taxes or assessments levied pursuant to subdivision 2 or 3 within the zone or participating zones benefited by such construction in the year or years immediately following the use of those funds.

(b) Fees or charges collected under authority of Section 5, subdivision 9, or Section 26.

Taxes or assessments under paragraph (a) of subdivision 1 may be levied for purposes of this subdivision of this section by either of the following methods:

(a) By a levy or assessment upon all property within the District, including land, improvements thereon, and personal property.

(b) By a levy or assessment upon all real property within the District, including both land and improvements thereon.

2. To levy taxes or assessments in each or any of the zones and participating zones, to pay the cost of carrying out any of the objects or purposes of this act performed or to be performed on behalf of the respective zones, including the constructing, maintaining, operating, extending, repairing or otherwise improving any or all works or improvements established or to be established within or on behalf of the respective zones, according to the benefits derived or to be derived by the respective zones, by any of the following methods:

(a) By a levy or assessment upon all property within a zone or participating zone, including land, improvements thereon, and personal property.

(b) By a levy or assessment upon all real property within a zone or participating zones, including both land and improvements thereon.

(c) By a levy or assessment upon land only within a zone or participating zones. It is declared that for the purposes of any tax or assessment levied under this subdivision, the property so taxed or assessed within a given zone is equally benefited.

3. To levy assessments upon any property in each of any of said zones, according to the provisions and procedures of the Improvement Act of 1911, the Improvement Bond Act of 1915, the Municipal Improvement Act of 1913, or the Refunding Assessment Bond Act of 1935.

In the event of project cooperation with any of the governmental bodies as authorized in subdivision 7 of Section 5 of this act, and the making of a contract with any such governmental body for the purposes set forth in the subdivision 7 of Section 5, by the terms of which work is agreed to be performed by any such governmental body in any specified zone or participating zones, for the particular benefit thereof, and by the contract it is agreed that the District is to pay to the governmental body, a sum of money in consideration or subvention for the performance of the work by the governmental body, the board may levy and collect a special tax or assessment upon the property in the zone or participating zones, whereby to raise funds to enable the District to make the payment, in addition to other taxes or assessments herein otherwise provided for.

The taxes or assessments shall be levied and collected together with, and not separately from taxes for county purposes, and the revenues derived from the District taxes or assessments, together with penalties thereon, shall be paid into the county treasury to the credit of the District, or the respective zones thereof, and the board may control and order the expenditure thereof for those purposes; provided, however, that no revenues, or portions thereof, derived in any of the several zones from the taxes or assessments levied under the provisions of subdivision 2 of this section shall be expended for constructing, maintaining, operating, extending, repairing or otherwise improving any works or improvements located in any other zone, except in the case of joint projects, or for projects authorized or established outside such zone, or zones, but for the benefit thereof. I n cases of projects joint to two or more zones, the zones will become, and shall be referred to as, participating zones.

§13.1 [no section with this number]

§**13.2 Special Taxes**

Sec. 13.2 For the purposes of levying special taxes pursuant to paragraph (2) of Section 13, the District may impose special taxes in accordance with Article 3.5 (commencing with Section 50075) of Chapter 1 of Part 1 of Division 1 of Title 5 of the Government Code at minimum uniform rates per land use category and size. The District may provide an exemption from these taxes for residential parcels owned and occupied by one or more taxpayers who are at least 65 years of age if the total household income is less than an amount that is approved by the voters of the District.

§ 14. Bonded indebtedness; procedure

Sec. 14. (1) Whenever the board determines that a bonded indebtedness should be incurred to pay the cost of any project in any zone or zones, the board may by resolution, determine and declare the respective amounts of bonds to be issued to raise the amount of money necessary for each project and the denomination and the maximum rate of interest of said bonds. In determining each amount of bonds and the amount of money necessary for each project, the board may include therein the portion, if any, of cost of such project theretofore advanced by the District for which the District proposes to reimburse itself from the proceeds of sale of any bonds to be issued to pay for said project and the cost of lands, rights of way, easements and property proposed to be taken, acquired or injured in carrying out said project and also of all incidental expenses likely to be incurred in connection therewith, including legal, clerical, engineering, superintendence, inspection, printing and advertising, and, if deemed advisable, a sum sufficient to pay interest on any bonds proposed to be issued during all or any part of the period of construction of said project and for not to exceed 12 months thereafter. The board shall cause a copy of the resolution, duly certified by the clerk, to be filed for record in the Office of the Recorder of Santa Clara County within five (5) days after its issuance. From and after said filing of said copy of said resolution the board shall be deemed vested with the authority to proceed with the bond election.

(2) After the filing for record of the resolution specified in subdivision (1) of this section, the board may call a special bond election in said zone or participating zones at which shall be submitted to the qualified electors of said zone or participating zones the question whether or not bonds shall be issued in the amount or amounts determined in said resolution and for the purpose or purposes therein stated. Said bonds and the interest thereon shall be paid from revenue derived from annual taxes or assessments levied as provided in this act.

(3) Said board shall call such special bond election by ordinance and not otherwise and submit to the qualified electors of said zone or participating zones, the proposition of incurring a bonded debt in said zone or participating zones in the amount and for the purposes stated in said resolution and shall recite therein the objects and purposes for which the indebtedness is proposed to be incurred; provided, that it shall be sufficient to give a brief, general description of such objects and purposes, and refer to the recorded copy of such resolution adopted by said board, and on file for particulars; and said ordinances shall also state the estimated cost of the proposed project, the amount of the principal of the indebtedness to be incurred therefore, and the maximum

rate of interest to be paid on said indebtedness, and shall fix the date on which such special election shall be held, and the form and contents of the ballot to be used. The rate of interest to be paid on such indebtedness shall not exceed eight percent (8%) per annum. For the purposes of said election, said board shall in said ordinance establish special bond election precincts within the boundaries of each zone and participating zone and may form election precincts by consolidating the precincts established for general elections in said District to a number not exceeding six general precincts for each such special bond election precinct, and shall designate a polling place and appoint one inspector, one judge, and one clerk for each such special bond election precincts.

In all particulars not recited in said ordinance, such special bond election shall be held as nearly as practicable in conformity with the general election laws of the state, except as provided herein.

Said board shall cause a map or maps to be prepared covering a general description of the project, which said map shall show the location of the proposed projects, and shall cause the said map to be posted in a prominent place in the county courthouse for public inspection for at least thirty (30) days before the date for such election.

Said ordinance calling for such special bond election shall, prior to the date set for such election, be published pursuant to Section 6062 of the Government Code in a newspaper of general circulation circulated in each zone and participating zone affected. The last publication of such ordinance must be at least fourteen (14) days before said election, and if there be no such newspaper, then such ordinance shall be posted in five public places designated by the board, in each zone and participating zone for at least thirty (30) days before the date fixed for such election. No other notice of such election need be given nor need polling place cards be issued.

Any defect or irregularity in the proceedings prior to the calling of such special bond election shall not affect the validity of the bonds authorized by said election. If at such election two-thirds (2/3) of the votes cast are in favor of incurring such bonded indebtedness, then bonds for such zone or participating zones for the amounts stated in such proceedings shall be issued and sold as in this act provided.

§ 15. Bonds; forms; terms; maturity; denominations; signatures

Sec. 15. The board shall, subject to the provisions of this act, prescribe by resolution the form of said bonds, which must include a designation of the zone or participating zones affected, and of the interest coupons attached thereto. Said bonds shall be payable annually or semiannually at the discretion of the board each and every year on a day and date, and at a place to be fixed by said board, and designated in such bonds, together with the interest on all sums unpaid on such date until the whole of said indebtedness shall have been paid.

The board may divide the principal amount of any issue into two or more series and fix different dates for the bonds of each series. The bonds of one series may be made payable at different times from those of any other series. The maturity of each series shall comply with this section. The board may fix a date, not more than two years from the date of issuance, for the earliest maturity of each issue or series of bonds. The final maturity date shall not exceed 40 years from the time of incurring the indebtedness evidenced by each issue or series. The board may provide for call and redemption of all or any part of any issue or series of bonds before maturity at prices determined by the board. No bond shall be subject to call or redemption prior to maturity unless it contains a recital to that effect.

The bonds shall be issued in such denominations as the board may determine, except that bonds shall be issued in denominations of one thousand dollars ($1,000) or more, and shall be payable on the days and at the place fixed in said bonds, and with interest at the rate specified in such bonds, which rate shall not be in excess of eight percent (8%) per annum, and shall be made payable annually or semiannually, and said bonds shall be numbered consecutively and shall be signed by the chairman of the board, and countersigned by the auditor of said District, and the seal of said District shall be affixed thereto by the clerk of the board. Either or both such signatures may be printed, engraved or lithographed. The interest coupons of said bonds shall be numbered consecutively and signed by the said auditor by his printed, engraved or lithographed signature. In case any such officer whose signatures or countersignatures appear on the bonds or coupons shall cease to be such officer before the delivery of such bonds to the purchaser, such bonds and coupons and signatures or countersignatures shall nevertheless be valid and sufficient for all purposes the same as if such officer had remained in office until the delivery of the bonds.

§ 16. Bonds; issuance and sale; proceeds; payments

Sec. 16. The board may issue and sell the bonds of such zones authorized as hereinbefore provided at not less than par value, and the proceeds of the sale of such bonds shall be placed in the treasury of the County of Santa Clara to the credit of said District and the respective participating zones thereof, for the uses and purposes of the zone, or zones voting said bonds; and the proper record

of such transactions shall be placed upon the books of said county treasurer, and said respective zone funds shall be applied exclusively to the purposes and objects mentioned in the ordinance calling such special bond election as aforesaid, subject to the provisions in this act contained. Payments from said zone funds shall be made upon demands prepared, presented, allowed and audited in the same manner as demands upon the funds of the County of Santa Clara.

§ 17. Bonds; payment from tax or assessment revenue

Sec. 17. Any bonds issued under the provisions of this act and the interest thereon shall be paid by revenue derived from an annual tax or assessment, levied as provided in clause (a) or (b) of subdivision 2 of Section 13 of this act. No zone nor the property therein shall be liable for the share of bonded indebtedness of any other zone, nor shall any moneys derived from taxation or assessment in any of the several zones be used in payment of principal or interest or otherwise of the share of bonded indebtedness chargeable to any other zone, except in the case of joint projects by participating zones.

§ 18. Bond tax

Sec. 18. The board shall levy a tax or assessment each year sufficient to pay the interest and such portion of the principal of said bonds as is due or to become due before the time for making the next general tax levy. Such taxes or assessments shall be levied and collected in the respective zones of issuance together with and not separately from taxes for county purposes, and when collected shall be paid into the county treasury of said Santa Clara County to the credit of the zone of payment, and be used for the payment of the principal and interest on said bonds, and for no other purpose. The principal and interest on said bonds shall be paid by the county treasurer of said Santa Clara County in the manner provided by law for the payment of principal and interest on bonds of said county.

§ 19. Taxation; law applicable

Sec. 19. The provisions of law of this State, prescribing the time and manner of levying, assessing, equalizing and collecting county property taxes, including the sale of property for delinquency, and the redemption from such sale, and the duties of the several county officers with respect thereto, are, so far as they are applicable, and not in conflict with the specific provisions of this act, hereby adopted and made a part hereof.

§ 20. Adoption of budget

Sec. 20. The Board of Supervisors of Santa Clara County shall, at the time and place established by said board of supervisors for hearing and adopting the budget for said county, hear and adopt the budget submitted by the District, making such additions thereto or deletions there from as said board of supervisors deems to be in the best interest of the District.

§ 21. Bonds; legal investments

Sec. 21. The bonds of the District issued for any zone or zones thereof pursuant to this act, shall be legal investments for all trust funds, and for the funds of all insurance companies, banks, both commercial and savings, and trust companies, and for the state school funds, and whenever any money or funds may by law now or hereafter enacted be invested in bonds of cities, cities and counties, counties, school Districts or municipalities in the State of California, such money or funds may be invested in the said bonds of said District issued in accordance with the provisions of this act, and whenever bonds of cities, cities and counties, counties, school Districts or municipalities, may by any law now or hereafter enacted be used as security for the performance of any act, such bonds of said District may be so used.

This section of this act is intended to be and shall be considered the latest enactment with respect to the matters herein contained, and any and all acts or parts of acts in conflict with the provisions hereof are hereby repealed.

§ 22. Bonds; tax exemption; nature of District

Sec. 22. All bonds issued by said District under the provisions of this act shall be free and exempt from all taxation within the State of California. It is hereby declared that the District organized by this act is a reclamation District and an irrigation District within the meaning of Section 1§ of Article XIII and Section 13 of Article XI of the Constitution of this State.

§ 23. See Public Contract Code § 21161 (below)

§ 24. Bonded improvements; conformity to report, plans, specifications, etc.

Sec. 24. Any improvement for which bonds are voted under the provisions of this act, shall be made in conformity with the report, plans, specifications and map theretofore adopted, as above specified, unless the doing of any such work described in said report, shall be prohibited by law, or be rendered contrary to the best interest of the District by some change of conditions in relation thereto, in which event the board may order necessary changes made in such proposed work or improvements and may cause any plans and specifications to be made and adopted therefore.

§ 25. Additional bonds

Sec. 25. Whenever bonds have been authorized by any zone or participating zone of said District and the proceeds of the sale thereof have been expended as in this act authorized, and the board shall by resolution determine that additional bonds should be issued for carrying out the work of flood control, or for any of the purposes of this act, the board may again proceed as in this act provided, and submit to the qualified voters of said zone or participating zone, the question of issuing additional bonds in the same manner and with like procedure as hereinbefore provided, and all the above provisions of this act for the issuing and sale of such bonds, and for the expenditure of the proceeds thereof, shall be deemed to apply to such issue of additional bonds.

§ 25.1. Revenue bonds; issuance; law governing

Sec. 25.1. In addition to proceedings authorized under Sections 13, 14, 15, 16, 17, 18 and 24 of this act, whenever the board determines that it is in the public interest, it may borrow money to provide funds to pay the cost of any work or improvement in the District or in any zone or zones thereof by the issuance of revenue bonds pursuant to the Revenue Bond Law of 1941 (Chapter 6 (commencing with Section 54300) of Part 1, Division 2, Title 5 of the Government Code). If the work or improvement is determined by the board to be for a zone or zones comprising less than all the District, the election at which the proposition to issue such revenue bonds is submitted shall be held only in such zone or zones. Proceeds from the sale of any such revenue bonds shall be expended only in the zone or zones in which the proposition to issue such revenue bonds is approved. In the case of any conflict between the provisions of this act and the provisions of the Revenue Bond Law of 1941, the provisions of the Revenue Bond Law of 1941 shall control.

§ 25.2. Revenue bonds; water and electric power facilities; special election

Sec. 25.2. (a) Notwithstanding any other provision of this act, the District may from time to time, subject to the provisions of this section, issue bonds in accordance with the Revenue Bond Law of 1941, (Chapter 6 (commencing with Section 54300) of Part 1, of Division 2, of Title 5 of the Government Code) for the purpose of financing the construction, reconstruction, replacement, acquisition or improvement of any facility or facilities necessary or convenient for the storage, treatment, including reclamation, transmission, or distribution of water for beneficial use within the District and for the purpose of generation or transmission of electric power; provided, that this section shall not apply to the acquisition of any facility or facilities already employed in any such public utility use, except where the acquisition of the facility or facilities is by mutual agreement between the District and the owner of the property.

(b) The provisions of Sections 54380 to 54387, inclusive, of the Government code shall not apply to the issuance and sale of bonds pursuant to this section.

(c) The board shall not proceed under this section until it has submitted to the qualified voters of the District at a special election called by a resolution of the board a proposition as to whether the District may authorize and sell revenue bonds under this section. If a majority of the voters of the District voting on the proposition at the election vote in favor of the proposition, the board may proceed to issue and sell revenue bonds as provided by this section. If the proposition fails to carry at the election, the proposition shall not again be voted upon until at least six months have elapsed since the date of the last election at which the proposition was submitted.

(d) The resolution calling the election shall fix the date on which the election is to be held, the proposition to be submitted thereat, the manner of holding the election and of voting for or against the proposition, and shall state that in all other particulars the election shall be held and the votes canvassed as provided by law for the holding of elections within the District. The election may be held separately or may be consolidated with any other election authorized by law at which the voters of the District may vote. The resolution calling the election shall be published and no other notice of the election need by given.

§ 25.5. Defeated bond proposal; waiting period before new election

Sec. 25.5. Should a proposition for issuing bonds for any zone or participating zones submitted at any election under this act fail to receive the requisite number of votes of the qualified electors voting at such election to incur the indebtedness for the purpose specified, the board shall not for six months after such election call or order another election in such zone or participating zone for incurring indebtedness and issuing bonds under the terms of this act for the same objects and purposes.

§ 25.6. Indebtedness; limitation; purpose; short-term notes

Sec. 25.6. (a) The District may borrow money and incur indebtedness, not to exceed the amount of eight million dollars ($8,000,000) as provided in this section by action of the board of directors and without the necessity of calling and holding an election in the District.

(b) Indebtedness may be incurred pursuant to this section for any purpose for which the District is authorized to expend funds.

(c) Indebtedness incurred under this section shall be evidenced by short-term notes payable at stated times fixed by the board. The maturity of short-term notes shall be not later than five years from the date of issuance. Short-term notes shall bear interest at a rate not exceeding 10 percent per annum payable annually or semi-annually. Short-term notes shall be general obligations of the District payable from revenues, charges, taxes, and assessments levied for purposes of the District.

(d) Short-term notes shall not be issued pursuant to this section which are payable in any fiscal year in an amount which, when added to the interest thereon, exceeds 85 percent of the estimated amount of the revenues, charges, taxes, and assessments of or allocable to the District which will be available in that fiscal year for payment of short-term notes and the interest thereon.

§ 26. Groundwater charge; power to levy and collect

Sec. 26. The board shall have the power, in addition to the powers enumerated elsewhere in this act, to levy and collect a groundwater charge for the production of water from the groundwater supplies within a zone or zones of the District which will benefit from the recharge of underground water supplies of the distribution of imported water in such zone or zones.

§ 26.1. Definitions relative to groundwater charge

Sec. 26.1. As used in connection with the groundwater charge, the following words shall mean:
"Person," "owner," or "operator" means public agencies, federal, state, and local, private corporations, firms, partnerships, limited liability companies, individuals or groups of individuals, whether legally organized or not; "owner" or "operator" also means the person to whom a water-producing facility is assessed by the county assessor, or, if not separately assessed, the person who owns the land upon which a water-producing facility is located.

"Groundwater" means nonsaline water beneath the natural surface of the ground, whether or not flowing through known and definite channels; "nonsaline water" means water which has less than 1,000 parts of chlorides to 1,000,000 parts of water, both quantities measured by weight.

"Production" or "producing" means the extraction or extracting of groundwater, by pumping or any other method, from shafts, tunnels, wells (including, but not limited to, abandoned oil wells), excavations or other sources of groundwater, for domestic, municipal, irrigation, industrial, or other beneficial use, except that the terms do not mean or include the extraction of groundwater produced in the construction or reconstruction of a well, or water incidentally produced with oil or gas in the production thereof, or water incidentally produced in a bona fide mining or excavating operation or water incidentally produced in the bona fide construction of a tunnel, unless the groundwater so extracted shall be used or sold by the producer for domestic, municipal, irrigation, industrial, or other beneficial purpose.

"Water-producing facility" means any device or method, mechanical or otherwise, for the production of water from the groundwater supplies within the District or a zone thereof.

"Water production statement" means the certified statement filed by the owner or operator of a water- producing facility with the District of the production of groundwater of the facility in a specified period.

"Water year" means July 1st of one calendar year to June 30th of the following calendar year.

"Agricultural water" means water primarily used in the commercial production of agricultural crops or livestock.

§ 26.2. Groundwater charge zones; establishment; amendment

Sec. 26.2. Prior to the establishment of any groundwater charge, the board shall establish a zone or zones within the District within which the groundwater charge will be effective. Said zone or zones shall be established and may be amended to the extent and in the manner prescribed in Section 3 of this act.

§ 26.3. Purpose of groundwater charges; use of revenues

Sec. 26.3. Groundwater charges levied pursuant to this act are declared to be in furtherance of District activities in the protection and augmentation of the water supplies for users within a zone or zones of the District which are necessary for the public health, welfare and safety of the people of this State. The groundwater charges are authorized to be levied upon the production of groundwater from all water-producing facilities, whether public or private, within said zone or zones of the District for the benefit of all who rely directly or indirectly upon the groundwater supplies of such zone or zones and water imported into such zone or zones.

The proceeds of groundwater charges levied and collected upon the production of water from groundwater supplies within such zone or zones of the District are authorized and shall be used exclusively by the board for the following purposes:

1. To pay the costs of constructing, maintaining and operating facilities which will import water into the District which will benefit such zone or zones, including payments made under any contract between the District and the State of California, the United States of America, or any public, private or municipal utility.

2. To pay the costs of purchasing water for importation into such zone or zones, including payments made under contract to the State of California, the United States of America, or any public, private or municipal utility.

3. To pay the costs of constructing, maintaining and operating facilities which will conserve or distribute water within such zone or zones, including facilities for groundwater recharge, surface distribution, and the purification and treatment of such water.

4. To pay the principal or interest of any bonded indebtedness or other obligations incurred by the District on behalf of such zone or zones for any of the purposes set forth in paragraphs 1, 2, and 3 of this section.

The District may apply to any one or more of the purposes set forth in paragraphs 1, 2, 3, and 4 of this section any or all revenues received by the District from water sale contracts executed by the District pursuant to this act.

§ 26.4. Registration of water-producing facilities; violation; penalty

Sec. 26.4. Within six months after the date of establishing any such zone or zones, all water-producing facilities located within the boundaries of such zone or zones shall be registered with the District and, if required by the board, measured with a water-measuring device satisfactory to the District installed by the District or at the District's option by the operator thereof. Any new water-producing facility, constructed or reestablished, or any abandoned water-producing facility which is reactivated, after such date, shall be registered with the District and, if required by the board, measured with a water-measuring device satisfactory to the District within 30 days after the completion or reestablishment, or reactivation thereof.

Failure to register any water-producing facility, as required by this act, is a misdemeanor punishable by a fine of not to exceed five hundred dollars ($500), or imprisonment in the county jail for not to exceed six months, or by both such fine and imprisonment.

In addition to other information which the District may determine is necessary and may require in the registration form provided, there shall also be given information as to the owner or owners of the land upon which each water-producing facility is located, a general description and location of each water-producing facility, the name and address of the person charged with the operation of each water-producing facility, and the name or names and addresses of all persons owning or claiming to own an interest in the water-producing facility.

§ 26.5. Annual report on District's activities; contents

Sec. 26.5. (a) The District shall annually prepare a written report upon the District's activities in the protection and augmentation of the water supplies of the District. The report shall include, among other information the board may order, a financial analysis of the District's water utility system; information as to the present and future water requirements of the District, the water supply available to the District, and future capital improvement and maintenance and operating requirements; a method of financing those requirements; a recommendation as to whether or not a groundwater charge should be levied in any zone or zones of the District during the ensuing water year and, if any groundwater charge is recommended, a proposal of a rate or rates per acre-foot for agricultural water and a rate or rates per acre-foot for all water other than agricultural water for the zone or zones, which rate or rates, as applied to operators who produce groundwater above a specified annual amount, may be subject to prescribed, fixed, and uniform increases in proportion to increases by that operator in groundwater production over the production of that operator for a prior base period to be specified by the board.

(b) The report shall not contain a recommendation of any increases in proportion to increased production in a zone unless based upon an analysis showing the cause of the reduction in the groundwater levels of the zone requiring the increases, with attention given to the effect of extractions of pumpers outside of, as well as within the zone, and with an evaluation of alternative measures which may feasibly be taken within the entire affected groundwater basin and of any alternative supplies of water available for that

zone, including the availability of treated water supplied by the District or treated groundwaters or groundwaters extracted in a cleanup operation and available to the District for reuse. The report shall be consistent with any conservation and reuse plan approved by the State Water Resources Control Board. The report shall also include all of the following:

(1) The amount of groundwater produced in the proposed zone and alternative water sources.

(2) The estimated costs of recharging each zone or zones.

(3) The estimated costs of mitigating any effects of pumping.

(4) Information specifying the benefits that have been received and will be received within the zone or zones where a groundwater charge has been levied and collected, or is recommended to be levied and collected.

§ 26.6. Hearing on report; notice

Sec. 26.6. On or before the first Tuesday in April of each year the report shall be delivered to the clerk of the District board in writing. The clerk shall publish pursuant to Section 6061 of the Government Code, a notice of the receipt of the report and of the public hearing to be held on or before the fourth Tuesday in April in a newspaper of general circulation printed and published within the District, at least 10 days prior to the date at which the public hearing regarding the report shall be held. The notice, among other information which the District may provide, shall contain an invitation to all operators of water-producing facilities within the District and to any person interested in the District's activities in the protection and augmentation of the water supplies of the District to call at the offices of the District to examine the report. There shall be held on or before the fourth Tuesday of April of each year, in the chambers of the board, a public hearing at which time any operator of a water-producing facility within the District, or any person interested in the District's activities in the protection and augmentation of the water supplies of the District, may in person, or by representative, appear and submit evidence concerning the subject of the written report.

§ 26.7. Levy and collection of groundwater charges; rates; new or adjusted charges, reports; notice; hearing; errors

Sec. 26.7. (A)

(1) Prior to the end of the water year in which hearing is held, and based upon the findings and determinations from the hearing, the board shall determine whether or not a groundwater charge should be levied in any zone or zones.

(2) If the board determines that a groundwater charge should be levied, it shall levy, assess, and affix the charge or charges against all persons operating groundwater-producing facilities within the zone or zones during the ensuing water year.

(3) The charge shall be computed at a fixed and uniform rate or rates per acre-foot for agricultural water, and at a fixed and uniform rate or rates per acre-foot for all water other than agricultural water.

Sec. 26.7. (B)

Different rates may be established in different zones, except that in each zone the rate or rates for agricultural water shall be fixed and uniform and the rate or rates for water other than agricultural water shall be fixed and uniform.

Sec. 26.7. (C)

The rate or rates, as applied to operators who produce groundwater above a specified annual amount, may, except in the case of any person extracting groundwater in compliance with a government-ordered program of cleanup of hazardous waste contamination, be subject to prescribed, fixed, and uniform increases in proportion to increases by that operator in groundwater production over the production of that operator for a prior base period to be specified by the board, upon a finding by the board that conditions of drought and water shortage require the increases. The increases shall be related directly to the reduction in the affected zone groundwater levels in the same base period.

Sec. 26.7. (D)

The rates shall be established each year in accordance with a budget for that year submitted by the District to the Board of Supervisors of Santa Clara County pursuant to this act, or amendments or adjustments to that budget, and shall be fixed and uniform rates for agricultural water and for all water other than agricultural water, respectively, except that each such rate for agricultural water shall not exceed one- fourth of the rate for all water other than agricultural water.

(1) The board may also impose or adjust any groundwater charge, and the rate of any charge, on or before January 1 of each water year or at any time during the 1992-93 water year whenever the board determines that the imposition or adjustment of the charge is necessary.

(2) The Board shall prepare a supplemental report to the annual report prepared pursuant to Section 26.5, explaining the reasons for the imposition or adjustment of the charge. The board shall file the supplemental report with the clerk of the board at least 45 days before the date the new or adjusted charge is proposed to take effect.

(3) a) The clerk shall publish in a newspaper of general circulation published within the District, pursuant to Section 6061 of the Government Code, a notice of the receipt of the supplemental report and a hearing to be held on the proposed imposition or adjustment of the groundwater charge at least 31 days before the date on which the new or adjusted charge is proposed to take effect and at least 10 days before the date of the hearing.

(3) B) The notice shall invite any operator of a water-producing facility within the District and other interested parties to examine the supplemental report prepared pursuant to paragraph (2) at the District office.

(4) a) A public hearing shall be held at least 21 days before the date on which the new or adjusted groundwater charge is proposed to take effect in the chambers of the board.

(4) B) Any operator of a water-producing facility within the District may, in person or by means of a representative, present evidence at the hearing concerning the imposition or adjustment of the groundwater charge.

(4) c) Any groundwater charge levied pursuant to this section shall be in addition to any general tax or assessment levied within the District or any zone or zones thereof.

(4) d) Clerical errors occurring or appearing in the name of any person or in the description of the water- producing facility where the production of water there from is otherwise property[1] charged, or in the making or extension of any charge upon the records which do not affect the substantial rights of the assessee or assessees, shall not invalidate the groundwater charge.

§ 26.8. Notice to owners or operators

Sec. 26.8. The District, after the levying of the groundwater charge, shall give notice thereof to each owner or operator of each water-producing facility in the zone or zones as disclosed by the records of said District, which notice shall state the rate for each class of water of the groundwater charge for each acre- foot of water to be produced during the ensuing water year. Said notice may be sent by postal card or by other first-class mail and with postage prepaid by the District.

§ 26.9. Water production statement; computation of charges; interest and penalties

Sec. 26.9. (a) After the establishment of a zone in which a groundwater charge may be levied, each owner or operator of a water-producing facility within the zone, until the time that the water-producing facility has been permanently abandoned, shall file with the District, on or before the 30th day following the end of collection periods established by the board, a water production statement setting forth the total production in acre-feet of water for the preceding collection period, a general description or number locating each water- producing facility, the method or basis of the computation of the water production, and the amount of the groundwater charge based on the computation. The collection periods may be established at intervals of not more than one year or less than one month. If no water has been produced from the water-producing facility during a preceding collection period, this statement shall be filed as provided for in this section, setting forth that no water has been produced during the applicable period. The statement shall be verified by a written declaration under penalty of perjury.

(b) The groundwater charge is payable to the District on or before the last date upon which the water production statements shall be filed, and is computed by multiplying the production in acre-feet of water for each classification as disclosed in the statement by the groundwater charge for each classification of water. The owner or operator of a water-producing facility which is being permanently abandoned shall give written notice of the abandonment to the District. If any owner or operator of a water-producing facility fails to pay the groundwater charge when due, the District shall charge interest at the rate of 1 percent each month on the delinquent amount of the groundwater charge.

(c) f any owner or operator of a water-producing facility fails to register each water-producing facility, or fails to file the water production statements as required by this act, the District shall, in addition to charging interest, assess a penalty charge against the owner or operator in an amount of 10 percent of the amount found by said District to be due. The board may adopt regulations to provide that in excusable or justifiable circumstances the penalty may be reduced or waived.

(d) If any owner or operator of a water-producing facility fails to file a water production statement as required by this act, the District shall, in addition to charging interest and assessing a penalty charge, assess an administrative charge to recover the costs of collection. The board may adopt regulations to provide that in excusable or justifiable circumstances the administrative charge may be reduced or waived.

(e) If a water-measuring device is permanently attached to a water-producing facility, the record of production as disclosed by the water-measuring device shall be presumed to be accurate and shall be used as the basis for computing the water production of the water-producing facility in completing the water production statement, unless it can be shown that the water-measuring device is not measuring accurately.

(f) If a water-measuring device is not permanently attached to a water-producing facility, the board may establish a method or methods to be used in computing the amount of water produced from the water-producing facilities. The methods may be based upon any or all of the following criteria: the minimum charge sufficient to cover administrative costs of collection, size of water-producing facility discharge opening, area served by the water-producing facility, number of persons served by the water-producing facility, use of land served by the water-producing facility, crops grown on land served by the water-producing facility, or any other criteria or criteria[1] which may be used to determine with reasonable accuracy the amount of water produced from that water-producing facility. The District may levy an annual charge upon a water-producing facility for which no production has been recorded but which has not been permanently abandoned if that charge does not exceed the annual cost to the District of maintaining and administering the registration of that facility.

§ 26.10. Amendment of statement; correction of records

Sec. 26.10. Upon good cause shown, an amended statement of water production may be filed or a correction of the records may be made at any time within six months of filing the water production statement; provided that if pursuant to Section 26.13, the owner or operator has been notified of a determination by the District that the production of water from the water-producing facility is in excess of that disclosed by the sworn statement covering such water-producing facility, and such owner or operator fails to protest such determination in the manner and in the time set forth in Section 26.13, the owner or operator shall be precluded from later filing an amended water production statement for that period for such water-producing facility.

§ 26.11. Record of water production and groundwater charges

Sec. 26.11. The District shall prepare each year a record called ``The Record of Water Production and Groundwater Charges'' in which shall be entered a general description of the property upon which each water- producing facility is located, an identifying number or code which is assigned to such facility, the annual water production for each class of water produced from each water-producing facility, and the groundwater charge for each class of water.

§ 26.12. Injunctive relief; grounds; process; procedure

Sec. 26.12. The superior court of the county in which the District lies may issue a temporary restraining order upon the filing by the District with said court of a petition or complaint setting forth that the person named therein as defendant is the operator of a water-producing facility which has not been registered with the District, or that such defendant is delinquent in the payment of a groundwater charge. Such temporary restraining order shall be returnable to said court on or before ten days after its issuance.

The court may issue and grant an injunction restraining and prohibiting the named defendant from the operation of any water-producing facility when it is established at the hearing that the defendant has failed to register such water-producing facility with the District, or that the defendant is delinquent in payment of groundwater charges thereon. Such court may provide that the injunction so made and issued shall be stayed for a period not to exceed ten days to permit the defendant to register the water-producing facility or to pay the delinquent groundwater charge.

Service of process is completed by posting a copy of the summons and complaint upon the water-producing facility or the parcel of land upon which it is located and by personal service upon the named defendant.

The right to proceed for injunctive relief granted herein is an additional right to those which may be provided elsewhere in this act or otherwise allowed by law. The procedure provided in Chapter 3 (commencing with Section 525), Title 7, Part 2, of the code of Civil Procedure, regarding injunctions shall be followed except insofar as it may herein be otherwise provided. The District shall not be required to provide an undertaking or bond as a condition to granting injunctive relief.

§ 26.13. Excess water production; investigation and report; fixing amount of production; protest

Sec. 26.13. If the District has probable cause to believe that the production of water from any water- producing facility is in excess of that disclosed by the sworn statements covering such water-producing facility, or if no statements are filed covering any water-producing facility, the District may cause an investigation and report to be made concerning the production of water from each such water-producing facility. The District may fix the amount of water production from any such water-producing facility at an amount not to exceed the maximum production capacity of such water-producing facility; provided, however, where a water-measuring device is permanently attached thereto, the record of production, as disclosed by such water-measuring device, shall be presumed to be accurate.

After such determination has been made by the District, a written notice thereof shall be mailed to the person operating such water-producing facilities at the address shown by the District's records. Any such determination made by the District shall be conclusive on all persons having an interest in such water- producing facility, and the groundwater charge, interest and penalties thereon, shall be paid forthwith, unless such person files with the board within 15 days after the mailing of such notice, a written protest setting forth the ground or grounds for protesting the amount of production so fixed. Upon the filing of such protest, the board thereafter shall hold a hearing at which time the total amount of the water production and the groundwater charge thereon shall be determined, which shall be conclusive if based upon substantial evidence. If the water production statement was filed and the amount disclosed thereon was paid within the time required by this act, and the board finds that the failure to report the amount of water actually produced resulted from excusable or justifiable circumstances, the board may waive the charge of interest on the amount found to be due. A notice of such hearing shall be mailed to the protestant at least 10 days before the date fixed for the hearing. Notice of the determination by the board shall be mailed to each protestant, who shall have 20 days from the date of mailing to pay the groundwater charge, interest or penalties provided by the provisions of this act.

Notice as required in this section shall be given by deposit thereof in any postal facility regularly maintained by the government of the United States in a sealed envelope with postage paid, addressed to the person on whom it is served at the name and address disclosed by the records of the District. The service is complete at the time of deposit.

§ 26.14. Collection of delinquent charges; interest and penalties; attachment

Sec. 26.14. The District may bring a suit in the court having jurisdiction against any operator of a water-producing facility within the District for the collection of any delinquent groundwater charge. The court having jurisdiction of said suit may, in addition to allowing recovery of costs to said District as allowed by law, fix and allow as part of the judgment interest and penalties as provided in Section 26.9. Should the District, as a provisional remedy in bringing such suit, seek an attachment against the property of any named defendant therein, the District shall not be required to provide a bond or undertaking as is otherwise provided for in the Code of Civil procedure of the State of California in Chapter 4 (commencing with Section 537), Title 7, Part 2, thereof.

§ 26.15. Production from unregistered facilities; violations; penalties

Sec. 26.15. It shall be unlawful to produce water from any water-producing facility required to be registered pursuant to the terms of this act unless such water-producing facility has been registered with the District within the time required by the provisions of this act and, if required by the board, has a water- measuring device affixed thereto capable of registering the accumulated amount of water produced therefrom.

Violation of this provision shall be punishable by a fine not to exceed five hundred dollars ($500), or imprisonment in the county jail for not to exceed six months, or by both such fine and imprisonment. Each day of operation in violation hereof shall constitute a separate offense.

§ 26.16. Interfering or tampering with measuring device; filing fraudulent statements

Sec. 26.16. Any person who injures, alters, removes, resets, adjusts, manipulates, obstructs or in any manner interferes or tampers with or procures or causes or directs any person to injure, alter, remove, reset, adjust, manipulate, obstruct or in any manner interfere or tamper with any water-measuring device affixed to any water-producing facility as required by this act, so as to cause said water-measuring device to improperly or inaccurately measure and record said water production, or any person who willfully does not file with the District a water production statement as prescribed and within the time required by this act, or any person who willfully removes or breaks a seal attached to an abandoned water-producing facility, or any person who with intent to evade any provision or requirement of this act files with the District any false or fraudulent water production statement is guilty of a misdemeanor and is punishable by a fine not to exceed five hundred dollars ($500), or imprisonment in the county jail not to exceed six months, or by both such fine and imprisonment.

§ 26.17. Enforcement powers

Sec. 26.17. In implementing the enforcement of the provisions of this act relating to groundwater charges, the District shall have the power, in addition to the powers enumerated elsewhere in this act:

1. To install and maintain water-measuring devices, and other devices which will aid in determining accurate water production, on water-producing facilities not owned by the District.

2. To affix seals to water-producing facilities which the owner or operator thereof has declared to be abandoned, or are in fact permanently abandoned.

3. To enter on to any land for the purposes enumerated in this section and for the purpose of making investigations relating to water production.

§ 27. Repeals or amendments; effect upon obligations

Sec. 27. The repeal or amendment of this act or the change in boundaries of any zone of the District shall not in any way affect or release any of the property in said District or any zone thereof from the obligations of any outstanding bonds or indebtedness until all such bonds and outstanding indebtedness have been fully paid and discharged.

§ 28. Right of way over public lands

Sec. 28. There is hereby granted to the District the right of way for the location, construction and maintenance of flood control channels, ditches, waterways, conduits, canals, storm dikes, embankments, and protective works in, over and across public lands of the State of California, not otherwise disposed of or in use, not in any case exceeding in length or width that which is necessary for the construction of such works and adjuncts or for the protection thereof. Whenever any selection of a right of way for such works or adjuncts thereto is made by the District the board thereof must transmit to the State Lands Commission, the Controller of the State and the recorder of the county in which the selected lands are situated, a plat of the lands so selected, giving the extent thereof and the uses for which the same is claimed or desired, duly verified to be correct. If the State Lands Commission shall approve the selections so made it shall endorse its approval upon the plat and issue to the District a permit to use such right of way and lands.

§ 29. Repealed

Sec. 29 is superseded by Section 1240.330 of the Code of Civil Procedure (below) and Section 861 of the Public Utilities Code (below).

§ 30. Claims for money or damages; law governing; other claims; procedure

Sec. 30. Claims for money or damages against the District are governed by Part 3 (commencing with Section 900) and Part 4 (commencing with Section 940) of Division 3.6 of Title 1 of the Government Code, except as provided therein. Claims not governed thereby or by other statutes or by ordinances or regulations authorized by law and expressly applicable to such claims shall be prepared and presented to the governing body, and all claims shall be audited and paid, in the same manner and with the same effect as are similar claims against the county.

§ 31. Property

Sec. 31. The legal title to all property, except shares of stock in mutual water companies or corporations, as provided in Section 17 of Article XVI of the California Constitution, acquired under this act shall immediately and by operation of law vest in the District, and shall be held by the District, in trust for, and is hereby dedicated and set apart to, the uses and purposes set forth in this act. The board may hold, use, acquire, manage, occupy, and possess the property, as herein provided; and the board may determine, by resolution duly entered in their minutes that any real property, or interest therein, held by the District is no longer necessary to be retained for the uses and purposes thereof, and may thereafter sell, lease, or otherwise dispose of the property pursuant to this section.

Real property that, in the unanimous judgment of the board, has no access to a public road, or that consists of an easement for ingress and egress to property that, by the terms of the easement, will terminate when ingress and egress is supplied to the property by a public road, may be sold, leased, or conveyed by the board on terms prescribed by it.

The board may re-convey real property to the former owner by whom the property was conveyed, or from whom the property was condemned by the District, or the owner's successor in interest for fair market value. Fair market value shall be determined by a qualified real estate appraiser. However, the District may re-convey real property to the former owner or his or her successor in

interest for less than fair market value if the District finds that a public purpose exists justifying that reconveyance for less than fair market value.

The board may by a majority vote exchange real property of equal value with any person, firm, or corporation for the purpose of removing defects in the title to real property owned by the District or where the real property to be exchanged is not required for District use and the property to be acquired is required for District use.

In all other cases, the board shall be governed in the sale, lease, or other disposition of real property by the requirements of law governing that action by counties; provided, however, that notice of the board's intended action shall be as prescribed in Section 25363 of the Government Code.

The board may by resolution prescribe a procedure for the leasing of real property owned by the District alternative to the requirements of law governing counties. The board may by a majority vote sell, lease, or otherwise transfer to the state, the County of Santa Clara, or to any city, school District, or other special District within the Santa Clara Valley Water District, or exchange with the public entities, any real or personal property or interest therein belonging to the District upon the terms and conditions that are agreed upon.

The board shall establish regulations for the trade in, survey, sale, or other disposition of personal property held by the District and no longer necessary to be retained for the uses and purposes thereof; provided, however, that any sale of personal property having a sale value in excess of that value stated from time to time by Section 1041.6 of

Article 2 of Subchapter 3 of Chapter 2 of Division 2 of the California Code of Regulations as a definition of "fixed assets," or any lower value as may be determined by the board, shall be made upon public bid preceded by notice of the board's intended action given as prescribed in Section 25363 of the Government Code.

§ 32. Action to test validity of District

Sec. 32. The District formed under this act in order to determine the legality of its existence, or any contract entered into by the District, may institute a proceeding therefore in the superior court of this State, in and for the County of Santa Clara, by filing with the clerk of said county a complaint setting forth the name of the District, its exterior boundaries, the date of its organization and a prayer that it be adjudged a legal flood control and water conservation and development District formed under the provisions of this act, or setting forth the name of the District, the parties to and nature of the contract, a copy of the contract, and a prayer that it be adjudged a legal contract. he summons in such proceeding shall be served by publishing a copy thereof once a week for four weeks in a newspaper of general circulation published in said county. The State of California shall be a defendant in such action, and consent therefore is given. Service of summons therein shall be made on the Attorney General. The Attorney General shall appear in such action on behalf of the State in the same manner as with appearances in civil actions. Within thirty (30) days after proof of publication of said summons shall have been filed in said proceeding, the State, any property owner or resident in said District, or any person interested may appear as a defendant in said action by serving and filing an answer to said complaint, in which case said answer shall set forth the facts relied upon to show the invalidity of the District, or the contract, and shall be served upon the attorney for said District before being filed in such proceeding. Such proceeding is hereby declared to be a proceeding in rem and the final judgment rendered therein shall be conclusive against all persons whomsoever, including the District and the State of California.

§ 33. Qualification of officers and employees; oath and bond; compensation of directors

Sec. 33. Each person elected or appointed to the office of director shall, within 10 days after receiving his or her certificate of election, or notice of appointment, qualify as such by taking and subscribing to an official oath. The director shall file his or her official oath with the clerk of the board.

The board may authorize each director to receive compensation not exceeding one hundred dollars ($100) per day for each day's attendance at meetings of the board, or committees thereof, or for each day's service rendered as a director by request of the board. No director may receive total compensation, other than for actual and necessary expenses, in excess of six hundred dollars ($600) per month.

Employees appointed by the board under this act, when required by the board of the District, shall execute bonds conditioned, executed, approved, filed, and recorded in the general manner and form provided by law for officers, other than supervisors, of the county, before entering upon the duties of their respective employments.

§ 34. Liberal construction

Sec. 34. This act, and every part thereof, shall be liberally construed to promote the objects thereof, and to carry out its intents and purposes.

§ 34.5. Exemption from special assessment investigation, limitation and majority protest act

Sec. 34.5. The provisions and procedures of law available under this act are not subject to “he Special Assessment Investigation, Limitation and Majority Protest Act of 1931.”

§ 35. Partial Invalidity

Sec. 35. If any provision of this act, or the application thereof to any person or circumstance, is held invalid, the remainder of the act, or the application of such provision to other persons or circumstances, shall not be affected thereby.

Public Contracts Code

Article 83. Santa Clara Valley Water District
21160. The provisions of this article shall apply to contracts by the Santa Clara Valley Water District, as provided for in Chapter 1405 of the Statutes of 1951.

21161. (A) Any improvement or unit of work not performed by District personnel and estimated by the engineer to cost in excess of twenty-five thousand dollars ($25,000) shall be done by contract. All contracts shall be let to the lowest responsible bidder or bidders in the manner provided in this article. The board shall first determine whether the contract shall be let as a single unit for the whole of the work, or shall be divided into severable parts, or both, according to the best interests of the District. The board shall call for bids and advertise the call by three insertions in a daily newspaper of general circulation or by two insertions in a newspaper of general circulation printed and published in the District inviting sealed proposals for the construction or performance of the improvement or work before any contract is made. The call for bids shall state whether the work is to be performed as a unit for the whole thereof or shall be divided into severable specific parts, or both, as stated in the call. The board may let the work by single contract or it may divide the work into severable parts by separate contracts, as stated in the call, according to the best interests of the District. The board shall require the successful bidder or bidders to file with the board good and sufficient bonds to be approved by the board conditioned upon the faithful performance of the contract and upon the payment of their claims for labor and material, the bonds to contain the terms and conditions set forth in Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code and to be subject to the provisions of that title. The board shall also have the right to reject any bid. In the event all proposals are rejected or no proposals are received pursuant to advertisement, or the estimated cost of the work does not exceed five thousand dollars ($5,000), or the work consists of channel protection, maintenance work, or emergency work, the board may, without advertising for bids, have the work done by force account. In case of an emergency, if notice for bids to let contracts will not be given, the board shall comply with Chapter 2.5 (commencing with Section 22050). The District may purchase in the open market, without advertising for bids, materials and supplies for use in any work either under contract or by force account.

(b) The provisions of this section requiring competitive bidding and the award of contracts to the lowest responsible bidder are inapplicable to the extent the improvement or unit of work is to be performed on its own facilities by a public utility subject to the jurisdiction of the California Public Utilities Commission.

Code of Civil Procedure

1240.330.

(a) Where necessary property is devoted to public use, any public entity authorized to exercise the power of eminent domain to acquire such property for a particular use may exercise the power of eminent domain to acquire substitute property in its own name, relocate on such substitute property the public use to which necessary property is devoted, and thereafter convey the substitute property to the owner of the necessary property if all of the following are established:

(1) The public entity is required by court order or judgment in an eminent domain proceeding, or by agreement with the owner of the necessary property, to relocate the public use to which the necessary property is devoted and thereafter to convey the property upon which the public use has been relocated to the owner of the necessary property.

(2) The substitute property is necessary for compliance with the court order or judgment or agreement.

(3) The owner of the necessary property will devote the substitute property to the public use being displaced from the necessary property.

(b) Where property is sought to be acquired pursuant to this section, the resolution of necessity and the complaint filed pursuant to such resolution shall specifically refer to this section and shall include a statement that the property is necessary for the purpose specified in this section. The determination in the resolution that the taking of the substitute property is necessary has the effect prescribed in Section 1245.250.

Public Utilities Code

Section 861

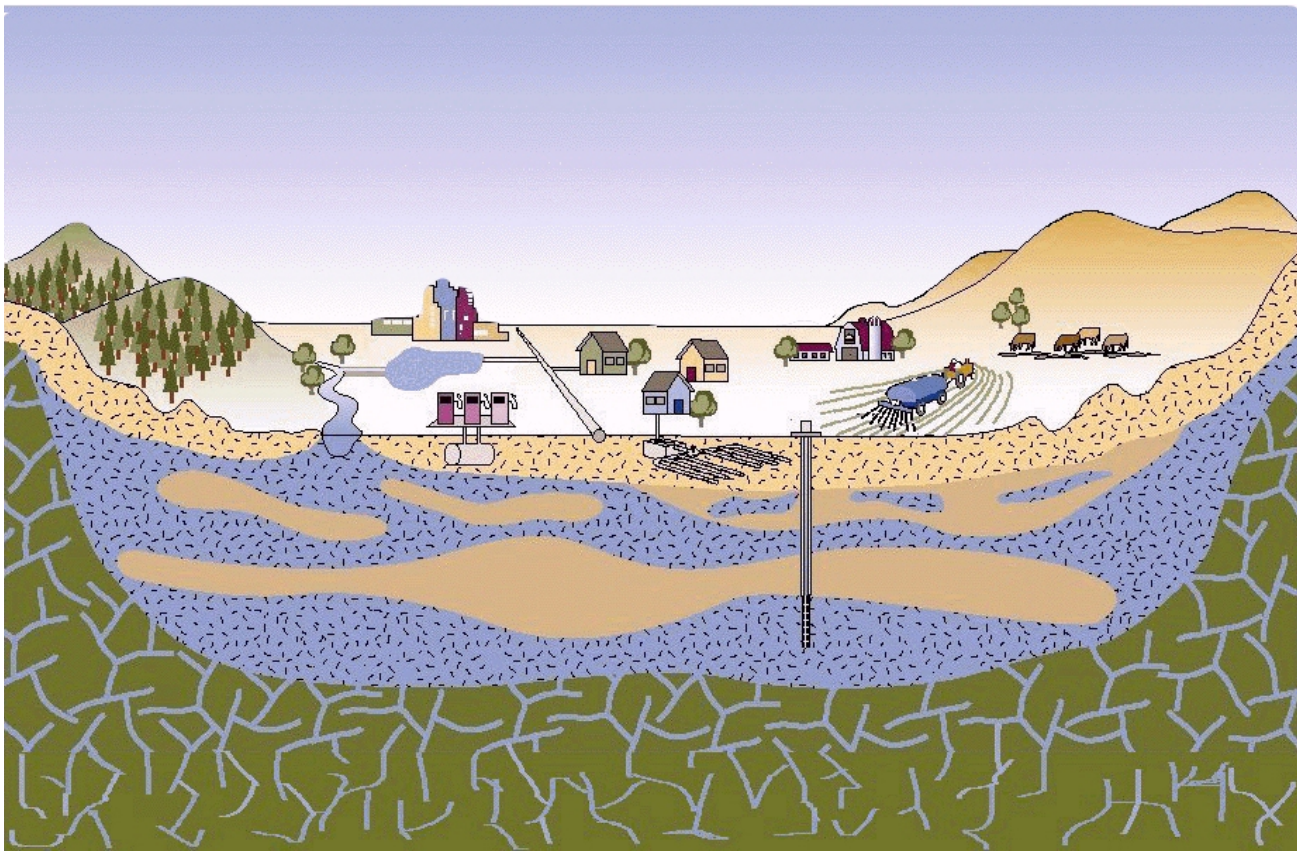
861. (a) As used in this section, "special law water District" means the Santa Clara Valley Water District and the Yuba-Bear River Basin Authority and, if created by an uncodified special law, any of the following: a county flood control District, a county flood control and water District, a county flood control and water conservation District, a county water conservation and flood control District, or a county water agency.

(b) Whenever by court order or judgment in an eminent domain proceeding or by agreement a special law water District is required to relocate any improvements of a public utility, if the special law water District and the public utility fail to agree as to the character or location of the new improvements to be relocated by the special law water District, the character and location of such new improvements and any other controversy relating thereto shall be submitted to and determined by the Public Utilities Commission in the manner prescribed in Chapter 6 (commencing with Section 1201).

Appendix D

District's Groundwater Management Plan 2001

Santa Clara Valley Water District
Groundwater Management Plan



July 2001

Santa Clara Valley Water District

SANTA CLARA VALLEY WATER DISTRICT

Santa Clara Valley Water District Groundwater Management Plan

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Joe Judge	District 2	Sig Sanchez	At Large
Richard P. Santos	District 3		
Larry Wilson	District 4		
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ACRONYMS USED

af – acre-feet
BMP – Best Management Practices
CEQA – California Environmental Quality Act
CIMIS – California Irrigation Management Information System
CVP – Central Valley Project
DEIR – Draft Environmental Impact Report
DRASTIC – Depth to water table, net Recharge, Aquifer media, Soil media, Topography, Impact of the vadose zone, and hydraulic Conductivity
DWR – Department of Water Resources
DWSAP – Drinking Water Source Assessment and Protection
EIR – Environmental Impact Report
EPA – Environmental Protection Agency
GIS – Geographic Information Systems
InSAR – Interferometric Synthetic Aperture Radar
IWRP – Integrated Water Resources Plan
LUSTOP – Leaking Underground Storage Tank Oversight Program
MCL – Maximum Contaminant Level
MOU – Memorandum of Understanding
MTBE – Methyl Tert Butyl Ether
NPDES – National Pollution Discharge Elimination System
NTU – Nephelometric Turbidity Unit
PCB - Polychlorinated biphenyl
RWQCB – Regional Water Quality Control Board
SBA – South Bay Aqueduct
SBWRP – South Bay Water Recycling Program
SCRWA – South County Regional Wastewater Authority
SCVWCD – Santa Clara Valley Water Conservation District
SCVWD – Santa Clara Valley Water District
SWRCB – State Water Resources Control Board
USGS – United States Geological Survey
UST – Underground Storage Tank
VOC – Volatile Organic Compound
WHP – Wellhead Protection Program
WMI – Watershed Management Initiative
WTP – Water Treatment Plant

EXECUTIVE SUMMARY

The Santa Clara Valley Water District (District) has managed the groundwater basin in Santa Clara County (County) since the early 1930s and is nationally recognized as a leader in groundwater management. The District works in conjunction with local retailers, the Regional Water Quality Control Board, and other agencies to ensure a safe and healthy supply of groundwater. In 2000, the groundwater basin supplied nearly half of the 390,000 acre-feet used in the County.

The District is the groundwater management agency in Santa Clara County as authorized by the California legislature under the Santa Clara Valley Water District Act (District Act), California Water Code Appendix, Chapter 60. Since its creation, the District has worked to minimize subsidence and protect the groundwater resources of the County under the direction of the District Act. As stated in the District Act, the District's objectives related to groundwater management are to recharge the groundwater basin, conserve water, increase water supply, and to prevent waste or diminution of the District's water supply.

The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through the comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner. In the Global Governance Commitment adopted by the District Board of Directors, it is stated that the conjunctive management of the groundwater basins is an integral part of the District's comprehensive water supply management program.

The District has always effectively managed the groundwater basin to fulfill the objectives of the District Act and its mission. The goal of these groundwater management efforts has been, and continues to be, ***to ensure that groundwater resources are sustained and protected***.

The Groundwater Management Plan formally documents the District's groundwater management goal and describes programs in place that are designed to meet that goal. The following programs are documented in the plan:

- Groundwater supply management programs that replenish the groundwater basin, sustain the basin's water supplies, help to mitigate groundwater overdraft, and sustain storage reserves for use during dry periods.

- Groundwater monitoring programs that provide data to assist the District in evaluating and managing the groundwater basin.

- Groundwater quality management programs that identify and evaluate threats to groundwater quality and prevent or mitigate contamination associated with those threats.

This plan serves as the first step toward a more formal and integrated approach to the management of groundwater programs, and to the management of the basin overall. The

various groundwater management programs and activities described in this document demonstrate that the District is proactive and effective in protecting the County's groundwater resources.

Recommendations

The groundwater management programs described in the Groundwater Management Plan were developed and implemented before the Board of Directors adopted the Ends Policies in 1999, and were therefore not driven by these formally documented ends. As the District is now guided by these policies, we need to ensure that the outcomes of our groundwater management programs match those of the Ends Policies. In addition, we need to ensure that existing programs are integrated and effective in terms of achieving the District's groundwater management goal.

Although the District manages the basin effectively, there is room for improvement of the groundwater management programs in terms of meeting these outcomes. Specific areas where further analysis is recommended include:

1. **Coordination between the Groundwater Management Plan and the Integrated Water Resources Plan (IWRP) –** As the District's water supply planning document through year 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

2. **Integration of groundwater management programs and activities** – Individual groundwater management programs tend to be implemented almost independently of other programs. A more integrated approach to the management of these programs, and to the management of the basin overall needs to be developed. Integration of these programs and improved conjunctive use strategies will result in more effective basin management.

3. **Optimization of recharge operations** – As artificial recharge is critical to sustaining groundwater resources, an analysis of the most effective amount, location, and timing of recharge should be conducted.

4. **Improved understanding of the groundwater basin** – In general, the existing groundwater management programs seem to focus on managing the basin to meet demands and protecting the basin from contamination and the threat of contamination. However, improving the District's understanding of the complexity of the groundwater basin is critical to improved groundwater management. The more we know about the basin, the better we can analyze the impact of different groundwater scenarios and management alternatives.

5. **Effective coordination and communication with internal and external agencies** – Improved communication and coordination will lead to improved groundwater

management programs. Increased sharing of ideas, knowledge, and technical expertise among people involved with groundwater at the District will result in increased knowledge, well-coordinated and efficient work, and well-informed analyses and conclusions. Improved coordination with external agencies, such as retailers and state and federal organizations, will result in improved knowledge of customer needs and increased awareness of District activities.

A detailed analysis of these areas and of all groundwater programs as they relate to the Ends Policies and the groundwater management goal is recommended. District staff have already begun to address some of these issues, which will be fully discussed in the first update to the Groundwater Management Plan. The update, which is scheduled for 2002, will fully address the issues above and the overall management of the basin by presenting a formal groundwater management strategy. The update will evaluate each groundwater program's contribution and effectiveness in terms of the groundwater management goal and outcomes directed by the Ends Policies. If there is no direct connection between the Ends Policies and a specific program, that program's contribution to other linked programs will be analyzed. The update will include recommendations for changes to existing programs or for the development of new programs, standards, or ordinances. The update will also develop an integrated approach for the management of groundwater programs, and for the management of the groundwater basin in general.

Groundwater is critical to the water supply needs of Santa Clara County. Therefore, it is of the utmost importance that the District continues the progress begun with this Groundwater Management Plan. Increased demands and the possibility of reduced imported water in the future make effective and efficient management of the groundwater basin essential. The Groundwater Management Plan and future updates will identify how the management of the groundwater basin can be improved, thereby ensuring that groundwater resources will continue to be sustained and protected.

Chapter 1
INTRODUCTION

The Santa Clara Valley Water District (District) has managed the groundwater basin in Santa Clara County (County) since the early 1930s and is nationally recognized as a leader in groundwater management. Effective management of the groundwater basin is essential, as the groundwater basin provides nearly half of the County's overall water supply. Since its creation, the District has implemented numerous groundwater management programs and activities to manage the basin and to ensure a safe and healthy supply of groundwater.

Purpose

The purpose of this Groundwater Management Plan is to describe existing groundwater management programs and to formally document the District's groundwater management goal of ensuring that groundwater resources are sustained and protected. The following groundwater management programs are documented in this plan:

- Groundwater supply management programs that replenish the groundwater basin, sustain the basin's water supplies, help to mitigate groundwater overdraft, and sustain storage reserves for use during dry periods.

- Groundwater monitoring programs that provide data to assist the District in evaluating and managing the groundwater basin.

- Groundwater quality management programs that identify and evaluate threats to groundwater quality and prevent or mitigate contamination associated with those threats.

Background

The District is the groundwater management agency in Santa Clara County as authorized by the California legislature under the Santa Clara Valley Water District Act (District Act), California Water Code Appendix, Chapter 60. Since its creation, the District has worked to minimize subsidence and protect the groundwater resources of the County under the direction of the District Act. As stated in the District Act, the District's objectives related to groundwater management are to recharge the groundwater basin, conserve water, increase water supply, and to prevent waste or diminution of the District's water supply. The District Act also provides the District with the authority to levy groundwater user fees and to use those revenues to manage the County's groundwater resources.

The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through the comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner. As part of the District's Global Governance Commitment adopted by the Board of Directors, "the District will provide a healthy, clean, reliable, and affordable water supply that meets or exceeds all applicable water quality regulatory standards in a cost-effective manner. Utilizing a variety of water supply sources and strategies, the District will pursue a comprehensive water

management program both within the county and statewide that reflects its commitment to public health and environmental stewardship." The policy also states that the conjunctive management of the groundwater basins to be an integral part of the District's comprehensive water supply management program.

The District has always effectively managed the groundwater basin to fulfill the objectives of the District Act and its mission. The goal of these efforts has been, and continues to be, to sustain and protect groundwater resources.

This Groundwater Management Plan is the District's first step toward a more formal and integrated approach to groundwater management. This Groundwater Management Plan describes existing groundwater management programs and formally documents the District's groundwater management goal, which is ***to ensure that groundwater resources are sustained and protected***.

Report Contents

The structure of the Groundwater Management Plan is outlined below. Chapters 3 through 5, which pertain to specific groundwater management programs, are organized to provide program objectives, related background information, the current status of the program, and information on the future direction of each program.

- Chapter 1 (this Introduction)

- Chapter 2 describes the geography and geology of the County as well as the history of local groundwater use. The chapter also describes the development of District facilities, and explains the various components of the existing water conservation and distribution system. A brief discussion on current groundwater conditions is also presented.

- Chapter 3 describes District groundwater supply management programs that replenish the groundwater basin, sustain the basin's supplies, and/or help in mitigating groundwater overdraft. In addition, the chapter summarizes the role of groundwater in the District's overall water supply outlook, and describes water use efficiency programs for groundwater users.

- Chapter 4 describes groundwater monitoring programs that provide data to assist the District in evaluating groundwater basin management.

- Chapter 5 describes groundwater quality management programs that evaluate groundwater quality and protect the groundwater from contamination and the threat of contamination.

- Chapter 6 summarizes existing groundwater management programs and activities designed to sustain and protect groundwater resources and provides recommendations for future work.

Chapter 2
BACKGROUND

This chapter describes the study area as well as the history of local groundwater use and the development of District facilities. Various components of the District's existing water conservation and distribution system are also described. A brief discussion on current groundwater conditions is also presented.

Geography

Santa Clara County is located at the southern tip of the San Francisco Bay. It encompasses approximately 1,300 square miles, making it the largest of the nine Bay Area counties. The County contributes about one fourth of the Bay Area's total population and more than a quarter of all Bay Area jobs.

Figure 2-1
Location of Santa Clara County

The County boasts a combination of physical attractiveness, economic diversity, and numerous natural amenities. Major topographical features include the Santa Clara Valley, the Diablo Range to the east, and Santa Cruz Mountains to the west. The Baylands lie in the northwestern part of the County, adjacent to the waters of the southern San Francisco Bay.

History of the County's Groundwater

Water has played an important part in the development of Santa Clara County since the arrival of the Spaniards in 1776. Unlike the indigenous peoples, who for thousands of years depended upon the availability of wild food, the Spaniards cultivated food crops and irrigated with surface water. Population growth and the United States' conquest of the area in 1846 increased the demand for these crops, which forced the use of the groundwater basin. Groundwater was drawn to the surface by windmill pumps or flowed up under artesian conditions. The first well was drilled in the early 1850s in San Jose.

By 1865, there were close to 500 artesian wells in the valley and already signs of potential misuse of groundwater supplies. In the valley's newspapers a series of editorials and letters appeared which complained of farmers and others who left their wells uncapped, and blamed them for a water shortage and erosion damage to the lowlands.

As a result of several dry years in the late 1890s, more and more wells were sunk. Dry winters in the early 1900s were accompanied by a growing demand for the County's fruits and vegetables, which were irrigated with groundwater. This trend of increased irrigation and well drilling continued until 1915. During this period, less water replenished the groundwater basin than was taken out, causing groundwater levels to drop rapidly.

In 1913 a group of farmers asked the federal government for relief from the increased cost of pumping that resulted from a lower groundwater table. The farmers formed an irrigation district to investigate possible reservoir sites; however, the following year was wet and no action was taken. It was not until 1919 that the Farm Owners and Operators Association presented a resolution to the County Board of Supervisors expressing their strong opposition to the waste resulting from the use of artesian wells, and again raised the issue of building dams to supplement existing water supplies. By that year subsidence of 0.4 ft had occurred in San Jose. Between 1912 and 1932 subsidence ranged from 0.35 ft in Palo Alto to 3.66 ft in San Jose.

In 1921, a report was presented to the Santa Clara Valley Water Conservation Committee showing that far more water was being pumped from the ground than nature could replace. The committee planned to form a water district that differed from others in the state by having a provision for groundwater recharge. Their effort to form the water district failed, but they were able to implement several water recharge and conservation programs. It was not until 1929 that the County's voters approved the Santa Clara Valley Water Conservation District (SCVWCD), with the initial mission of stopping groundwater overdraft and ground surface subsidence.

District History

The SCVWCD was the forerunner of today's District, which was formed through the consolidation and annexation of other flood control and water districts within Santa Clara County. By 1935, the District had completed the construction of Almaden, Calero, Guadalupe, Stevens Creek, and Vasona dams to impound winter waters for recharge into percolation facilities during the summer. Later dams completed include Coyote in 1936, Anderson in 1950 and Lexington in 1952. The Gavilan Water District in the southern

portion of the County constructed Chesbro Dam in 1955 and Uvas Dam in 1957. These dams enabled the District to capture surface water runoff and release it for groundwater recharge.

The late 1930s to 1947 marked a period of recovery in groundwater levels that reduced subsidence. In 1947 conditions became dry, groundwater levels declined rapidly and subsidence resumed. In 1950 almost all of the County's water requirements were met by water extracted from the groundwater basin. This resulted in an all-time low water level in the northern subbasin.

In 1952, the first imported water was delivered by the water retailers in northern Santa Clara County through the Hetch-Hetchy southern aqueduct. By 1960, the population of the County had doubled from that of 1950. To supply this growth, groundwater pumping increased and groundwater levels continued to decline. By the early 1960s, it was evident that the combination of Hetch-Hetchy and local water supplies could not meet the area's water demands, so the District contracted with the state to receive an entitlement of 100,000 acre-feet (af) per year through the South Bay Aqueduct (SBA).

The SBA supply could not be fully utilized for recharge in the groundwater basin. Hence, to supplement the basin, the District constructed its first water treatment plant (WTP), Rinconada. In 1967, the District started delivering treated surface water to North County residents (North County refers to the Santa Clara Valley Subbasin), thus reducing the need for pumping. This led to a recovery of groundwater levels and reduced the rate of subsidence as well.

From 1960 to 1970 the County's population nearly doubled yet again. The semiconductor and computer manufacturing industries contributed to almost 34 percent of the job growth between 1960 and 1970. Population growth and economic diversity seemed especially important to Santa Clara County, which had been predominantly agricultural. This transformation was not without its problems. In the early 1980s a major underground tank storing a solvent for a manufacturing process in south San Jose was discovered to be leaking and the District's attention focused on water quality of the groundwater basin.

The growth and prosperity of the County continued, and jobs grew 39 percent between 1970 and 1980. In 1974, Penitencia (the District's second WTP) started delivering treated water. Groundwater pumping accounted for about half of the total water use by the mid-1980s. The rate of subsidence was reduced to about 0.01 ft/year compared to 1 ft/year in 1961. To provide a reliable source of supply the District contracted with the federal government for the delivery of an entitlement of 152,500 af per year of imported water from the Central Valley Project (CVP) through the San Felipe Project. The first delivery of San Felipe water took place in 1987, but it was not until 1989 that the District's Santa Teresa WTP was began operating to fully utilize this additional source of imported supply. Since the 1980s, the population of Santa Clara County has continued to increase, and the change in land use toward urbanization has continued.

District Board of Directors

The District is governed by a seven-member Board of Directors. Five of the members are elected, one from each of the five County supervisorial districts, and the remaining two directors are appointed by the Santa Clara County Board of Supervisors to represent the County at large. The directors serve overlapping four-year terms.

The Board establishes policy on the District's mission, goals, and operations and represents the general public in deciding issues related to water supply and flood control. The Board also has the authority to adopt ordinances that have the force of law within the District. The Board reviews staff recommendations and decides which policies should be implemented in light of the District's mission and goals. The Board also monitors the implementation of its policies, and supervises management to see that work is accomplished on time and efficiently.

The Board of Directors holds biweekly public meetings, at which the public is given the opportunity to express opinions or voice concerns. In addition, the public can participate in the annual process of groundwater rate setting through public hearings.

The Board of Directors identifies the conjunctive management of the groundwater basins to maximize water supply reliability as an integral part of the District's commitment to a comprehensive water management program.

District System

As a water resource management agency for the entire County, the District provides a reliable supply of high-quality water to 13 private and public water retailers serving more than 1.7 million residents, and to private well owners who rely on groundwater.

The District operates and maintains a Countywide conservation and distribution system to convey raw water for groundwater recharge and treated water for wholesale to private and public retailers. The components of this distribution system are described in detail below.

Reservoirs

Local runoff is captured in reservoirs within the County with a combined capacity of about 169,000 af. The stored water is released for beneficial use at a later time. The District's reservoirs are described in Table 2-1 and are shown in Figure 2-2.

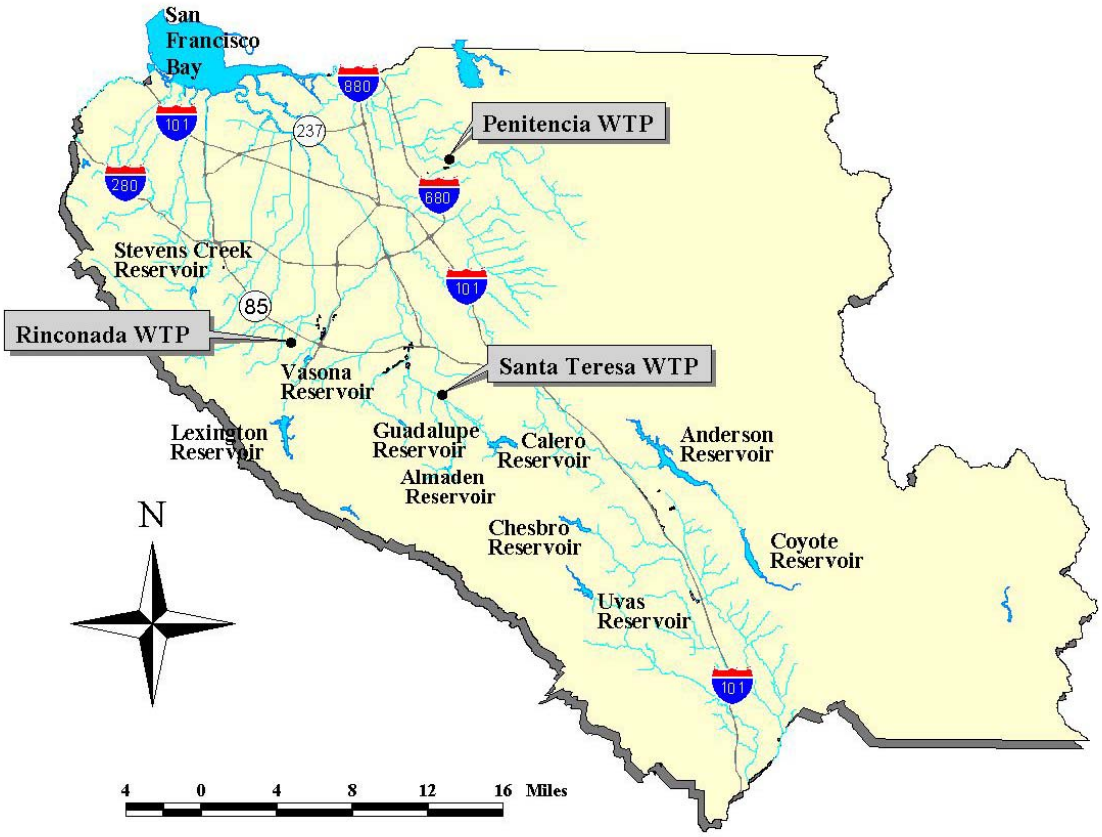
Treatment Plants

The District also operates three water treatment plants (WTPs): Rinconada, Penitencia, and Santa Teresa. These facilities are all connected by five major raw water conduits, which also connect the two imported raw water sources from the State Water Project (SWP) and the CVP. Two pumping plants (Coyote and Vasona) provide the lifts required for conveyance during peak usage.

Table 2-1
District Reservoirs

Reservoir	*Capacity(af)*	*Year Completed*	*Surface Area (ac)*	*Dam Height (ft)*
Almaden	*1,586*	*1935*	*59*	*108*
Anderson	*89,073*	*1950*	*1,245*	*240*
Calero	*10,050*	*1935*	*347*	*98*
Chesbro	*8,952*	*1955*	*265*	*95*
Coyote	*22,925*	*1936*	*648*	*138*
Guadalupe	*3,228*	*1935*	*79*	*129*
Lexington	*19,834*	*1952*	*475*	*195*
Stevens Creek	*3,465*	*1935*	*91*	*129*
Uvas	*9,935*	*1957*	*286*	*105*
Vasona	*400*	*1935*	*57*	*30*

Figure 2-2
District Reservoir Locations



Recharge Facilities
The Districts operates and maintains 18 major recharge systems, which consist of a combination of off-stream and in-stream facilities. These systems have a combined pond surface recharge area of more than 390 acres, and contain over 30 local creeks for artificial in-stream recharge to replenish the groundwater basin. The total annual average recharge capacity of these systems is 157,200 af.

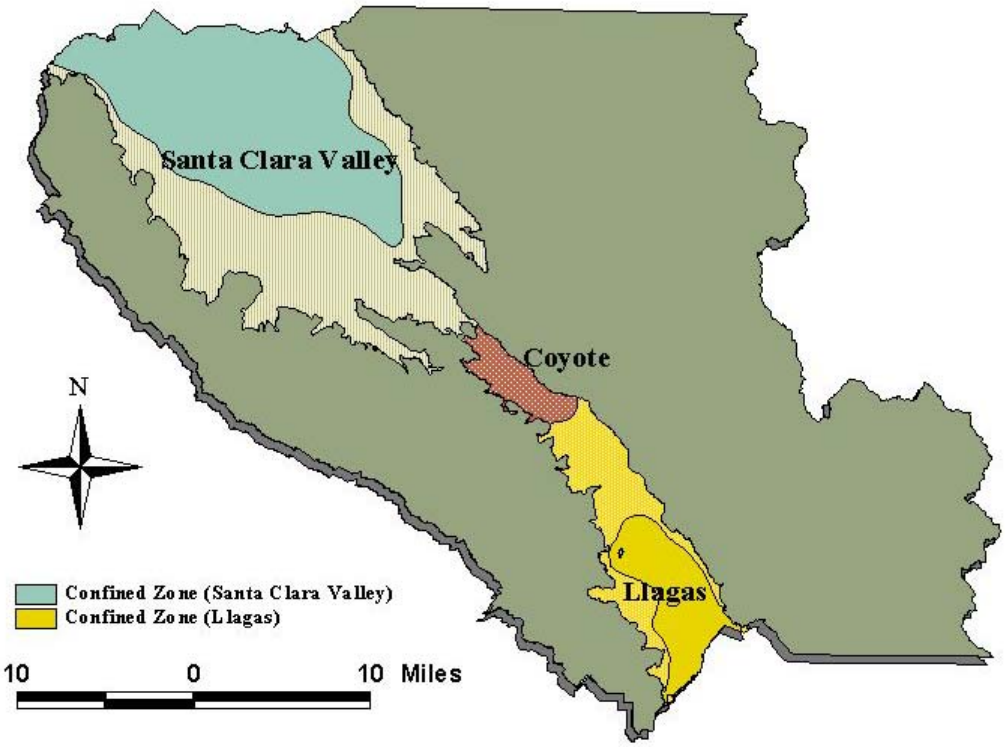
Groundwater Basins
The groundwater basin is divided into three interconnected subbasins that transmit, filter, and store water. These subbasins are portrayed in Figure 2-3. The Santa Clara Valley Subbasin in the northern part of the County extends from Coyote Narrows at Metcalf road to the County's northern boundary. The Diablo Range bounds it on the east and the Santa Cruz Mountains on the west. These two ranges converge at the Coyote Narrows to form the southern limits of the subbasin. The Santa Clara Valley Subbasin is approximately 22 miles long and 15 miles wide, with a surface area of 225 square miles. A confined zone within the northern areas of the subbasin is overlaid with a series of clay layers resulting in a low permeability zone. The southern area is the unconfined zone, or forebay, where the clay layer does not restrict recharge.

The Coyote Subbasin extends from Metcalf Road south to Cochran Road, where it joins the Llagas Subbasin at a groundwater divide. The Coyote Subbasin is approximately 7 miles long and 2 miles wide and has a surface area of approximately 15 square miles. The subbasin is generally unconfined and has no thick clay layers. This subbasin generally drains into the Santa Clara Valley Subbasin.

The Llagas Subbasin extends from Cochran Road, near Morgan Hill, south to the County's southern boundary. It is connected to the Bolsa Subbasin of the Hollister Basin and bounded on the south by the Pajaro River (the Santa Clara - San Benito County line). The Llagas Subbasin is approximately 15 miles long, 3 miles wide along its northern boundary, and 6 miles wide along the Pajaro River. A series of interbedded clay layers, which extends north from the Pajaro River, divides this subbasin into confined and forebay zones.

The three subbasins serve multiple functions. They transmit water through the gravelly alluvial fans of streams into the deeper confined aquifer of the central part of the valley. They filter water, making it suitable for drinking and for municipal, industrial, and agricultural uses. They also have vast storage capacity, together supplying as much as half of the annual water needs of the County. In 2000, the groundwater basin supplied 165,000 acre-feet of the total water use of 390,000 acre-feet.

Figure 2-3
Santa Clara County Groundwater Subbasins



Current Groundwater Conditions

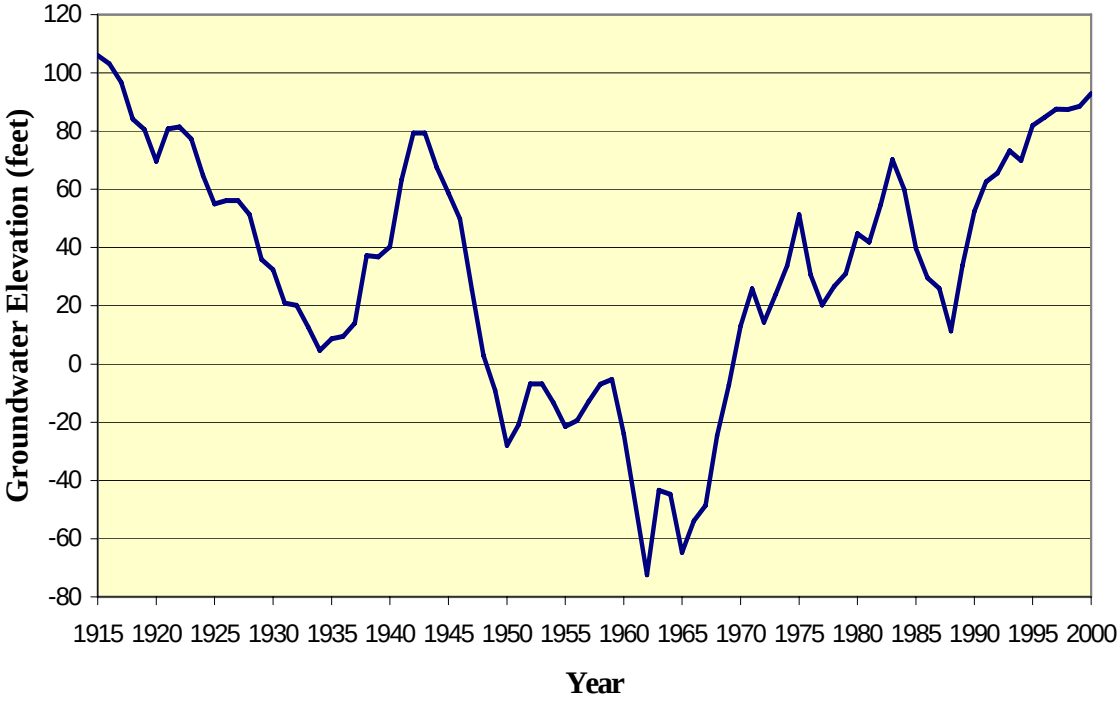
Groundwater conditions throughout the County are generally very good, as District efforts to prevent groundwater basin overdraft, curb land subsidence, and protect water quality have been largely successful. Groundwater elevations are generally recovered from overdraft conditions throughout the basin, inelastic land subsidence has been curtailed, and groundwater quality supports beneficial uses. The District evaluates current groundwater conditions based on the results of its groundwater monitoring programs, which are described in Chapter 4 of this plan.

Groundwater Elevations

Groundwater elevations are affected by natural and artificial recharge and groundwater extraction, and are an indicator of how much groundwater is in storage at a particular time. Both low and high elevations can cause severe, adverse conditions. Low groundwater levels can lead to land subsidence and high water levels can lead to nuisance conditions for below ground structures.

Figure 2-4 shows groundwater elevations in the San Jose Index Well in the Santa Clara Valley Subbasin. While groundwater elevations in the well are not indicative of actual groundwater elevations throughout the County, they demonstrate relative changes in groundwater levels.

Figure 2-4
Groundwater Elevations in San Jose Index Well



Land Subsidence
Land subsidence occurs in the Santa Clara Valley when the fluid pressure in the pores of aquifer systems is reduced significantly by overpumping, resulting in the compression of clay materials and the sinking of the land surface. Historically, the Santa Clara Valley Subbasin has experienced as much as 13 feet of inelastic, or nonrecoverable, land subsidence that necessitated the construction of additional dikes, levees, and flood control facilities to protect properties from flooding. The costs associated with inelastic land subsidence are high, as it can lead to saltwater intrusion that degrades groundwater quality and flooding that damages buildings and infrastructure. However, imported water from the State Water Project and Central Valley Project has increased District water supplies, reducing the demand on the groundwater basin, and providing water for the recharge of the basin. As a result, the rate of inelastic land subsidence has been curtailed to less than 0.01 feet per year.

Groundwater Quality
Natural interactions between water, the atmosphere, rock minerals, and surface water control groundwater quality. Anthropogenic (man-made) compounds released into the environment, such as nitrogen-based fertilizer, solvents, and fuel products, can also affect groundwater quality. Groundwater quality in the Santa Clara Valley Subbasin is generally high. Drinking water standards are met at public water supply wells without the use of treatment methods.

A few water quality problems have been detected. High mineral salt concentrations have been identified in the upper aquifer zone along San Francisco Bay, the lower aquifer zone underlying Palo Alto, and the southeastern portion of the forebay area of the Santa Clara Valley Subbasin. Nitrate concentrations in the South County (Coyote and Llagas Subbasins) are elevated and high nitrate concentrations are sporadically observed in the Santa Clara Valley Subbasin. Lastly, even though Santa Clara County is home to a large number of Superfund sites, there are few groundwater supply impacts from the chemicals from these sites; volatile organic compounds (VOCs) are intermittently detected at trace concentrations in public water supply wells. In four wells, such contamination has been severe enough to cause the wells to be destroyed. Overall, the District's groundwater protection programs, including its well permitting, well destruction, and leaking underground storage tank programs, have been effective in protecting the groundwater basin from contamination.

Water quality data for common inorganic compounds during the period from 1997 through 2000 are summarized in Table 2-2. The typical concentration ranges were computed using standard statistical methods. Organic compounds were nondetectable in almost all wells and below drinking water standards in all wells. Data for organic compounds, including MTBE, solvents, and pesticides is not shown in Table 2-2 due to the large number of compounds.

Table 2-2
Summary of Santa Clara County Groundwater Data (1997-2000) and Water Quality Objectives[a]

Constituents	Santa Clara Valley Subbasin		Coyote Subbasin	Llagas Subbasin	Drinking Water Standard	Ag. Objective[f]
	Principal Aquifer Zone[d]	Upper Aquifer Zone[d]				
Chloride (mg/l)	40 – 45	92 – 117	16 – 27	24 -52	500[c,e]	355
Sulfate (mg/l)	37 – 41	106 – 237	32 - 65	32 -65	500[c,e]	-
Nitrate (mg/l)	15 – 18	0.002 – 4	12 -38	44 -47	45[b]	30
Total Dissolved Solids (mg/l)	366 – 396	733 – 1210	250 - 490	320 -540	1000[c,e]	10,000
Sodium Adsorption Ratio	0.89 - 1.26	1.23 - 3.84	NA	NA	-	9
Electrical Conductance (uS/cm at 25 C)	596 - 650	1090 – 1590	375 - 391	500 - 715	1600[c,e]	3000
Aluminum (ug/l)	6 - 18	23 – 97	<5 - 86	5 -51	1000[b]	20,000
Arsenic (ug/l)	0.7- 1.2	1.2 – 3.7	<2	<2	50[b]	500
Barium (ug/l)	141 - 161	60 – 220	71 - 130	99 - 180	1000[b]	-
Boron (ug/l)	115 - 150	200 – 523	81 - 119	82 -159	-	500
Cadmium (ug/l)	<1	<0.5	< 0.5	<0.5	5[b]	500
Chromium (ug/l)	6 – 8	0.5 – 1.8	0.5 - 10	2 - 10	50[b]	1000
Copper (ug/l)	1.9 – 4.4	0.3 – 1	<1 - 50	0.75 – 3.90	1000[c]	-
Fluoride (mg/l)	0.13 – 0.16	0.15 – 0.3	0.12 – 0.21	0.12 – 0.17	1.8[b]	15
Iron (ug/l)	10 – 38	40 – 160	19 - 100	14 - 170	300[c]	20,000
Lead (ug/l)	0.2 – 1.1	<0.5	<2	<2	50[b]	10,000
Manganese (ug/l)	.15 – 1.5	120 – 769	<0.5 - 29	0.86 - 21	50[c]	10,000
Mercury (ug/l)	<1	<0.2	<0.2	<0.2	2[b]	-
Nickel (ug/l)	1.8 – 3.4	4 – 10	<2- 10	<2 - 10	100[b]	2000
Selenium (ug/l)	2.5 – 3.8	0.4 – 2	<2	<2	50[b]	20
Silver (ug/l)	<5	<0.5	<0.5	<0.5	100[b]	-
Zinc (ug/l)	3 – 8	3 - 13	<50	10 - 32	500[c]	10,000

[a] For common inorganic water quality constituents
[b] Maximum Contaminant Level as specified in Table 64431-A of Section 64431, Title 22 of the California Code of Regulations
[c] Secondary Maximum Contaminant Level as specified in Table 64449-B of Section 64449, Title 22 of the California Code of Regulations
[d] Typical range = approximate 95% Confidence Interval estimate of the true population median
[e] Upper limit of secondary drinking water standard
[f] Taken from the Water Quality Control Plan for the San Francisco Bay Basin, 1995 Regional Water Quality Control Boards

Chapter 3
GROUNDWATER SUPPLY MANAGEMENT

This chapter covers the District programs that relate to groundwater supply management. It describes the District's groundwater recharge, treated groundwater recharge/reinjection, and water use efficiency programs. It also summarizes the role of the groundwater basin in terms of the District's overall water supply plan, the Integrated Water Resources Plan (IWRP). Groundwater supply management programs support the District's groundwater management goal by sustaining the basin's groundwater supplies, mitigating groundwater overdraft, minimizing land subsidence, protecting recharge and pumping capabilities, and sustaining storage reserves for use during dry periods.

Future efforts in groundwater supply management will include strengthening the District's groundwater recharge program so that the District makes the most effective use of its resources with regard to the amount, location, and timing of groundwater recharge.

GROUNDWATER RECHARGE

Program Objective

The objective of the Groundwater Recharge Program is to sustain groundwater supplies through the effective operation and maintenance of District recharge facilities.

Background

Groundwater recharge is categorized as either natural recharge or facility recharge. The District defines "natural" groundwater recharge to be any type of recharge not controlled by the District. Sources may include rainfall, net leakage from pipelines, seepage from surrounding hills, seepage into and out of the groundwater basin, and net irrigation return flows to the basin. Facility recharge consists of controlled and uncontrolled recharge through District facilities, which include about 90 miles of stream channel and 71 off-stream recharge ponds. Controlled recharge refers to the active and intentional recharge of the basin by releases from reservoirs or the distribution system. Uncontrolled recharge occurs through District facilities, such as creeks, but refers to recharge that would occur without any action on the part of the District. This includes natural recharge through streams as a result of rainfall and runoff. This section focuses exclusively on controlled and uncontrolled facility recharge.

Current Status

The District's current recharge program is accomplished by releasing locally conserved water and imported water to District in-stream and off-stream recharge facilities.

In-stream Recharge

The controlled in-stream recharge accounts for approximately 45 percent of groundwater recharge through District facilities. In-stream recharge occurs along stream channels in the alluvial plain, upstream of the confined zone that eventually reaches the drinking water aquifer. The District can release flow for

recharge into 80 of the 90 miles of streams. Uncontrolled in-stream recharge accounts for approximately 20 percent of groundwater recharge.

Spreader dams have been a key component of the in-stream recharge program. These temporary or permanent dams are constructed within streambeds to impound water in the channels and increase recharge rates via percolation through stream banks. The use of spreader dams increases in-stream recharge capacity by about 15,000 af, or approximately ten percent. Spreader dams have been constructed at 60 or more sites since they were first employed in the 1920s.

Off-stream Recharge

The off-stream recharge accounts for approximately 35 percent of groundwater recharge through District facilities. The off-stream facilities include abandoned gravel pits and areas excavated specifically as recharge ponds. Ponds range in size from less than 1 acre to more than 20 acres. The District operates 71 off-stream ponds in 18 major recharge systems with a cumulative area of about 393 acres. Locally conserved and imported water is delivered to these ponds by the raw water distribution system.

Off-stream recharge facilities are generally operated in one of two modes: constant head mode or wet/dry cycle mode. The District most often uses the constant head mode, which involves filling the pond and maintaining inflow at a rate equal to the recharge rate of the pond. This operation is continued until the recharge rate of the pond has decreased to an unacceptable rate. In order to maintain high recharge rates, ponds are cleaned periodically. Pond cleaning is generally considered when the recharge rate has decreased by about 75 percent. The pond is then emptied and any sediment cleaned out. In some cases, the pond is emptied and allowed to dry out and the recharge operation is restarted without cleaning. However, this typically results in a slightly reduced recharge rate. The recharge rates of the District's ponds generally range from 1 af/acre/day to about 2 af/acre/day, although some ponds have rates up to 5 af/acre/day.

In the constant head mode, algae and weed growth generally occurs. The algae growth varies according to sunlight, water temperature, nutrients and other factors. As the algae dies, it falls to the pond bottom, also contributing to a reduced recharge rate. The algae are generally controlled using chemical additives. Using deeper ponds can also reduce algae growth, as ponds in the range of 13 to 15 feet deep do not support algae growth as rapidly as shallower ponds.

Water Quality

High turbidity of incoming water results in a rapid decrease of recharge rates. In order to increase recharge pond efficiency, the District works to reduce turbidity levels with coagulants, simple mixing procedures, settling basins and skimming weirs. At most facilities, water with turbidity levels up to about 100 Nephelometric Turbidity Unit (NTU) can be treated effectively. Water with turbidity levels of less than 10 NTU is usually not treated. Each NTU represents

several pounds of fine-grained material per acre-foot of water. Allowable influent turbidity levels may depend on the availability of water.

Monitoring
Recharge facilities are monitored around the clock by operations center personnel using a computerized control system, and in the field by technicians. The raw water control system provides for remote operation of water distribution facilities and real-time system performance data. Operations technicians perform daily inspection of recharge facilities and record flows and water levels.

A periodic water balance is performed to reconcile all measured imported water, inflows, releases and changes in surface water storage. The results of this balance become the final accounting for distribution and facility processing. The data is used for water rights reporting, accounting for usage of federal water, for facility performance measurement purposes, and for the groundwater basin water budget.

Future Direction
Although spreader dams have traditionally been a key component of the in-stream recharge program, their use has been limited significantly because of more stringent permitting due to fish and wildlife concerns.

The District has completed the feasibility testing of a direct injection facility to increase recharge and has completed construction of a full-scale well. The injection well has a capacity of 750 af/year and will be supplied with water treated at the Rinconada WTP. The potential for additional direct injection facilities may be evaluated in the future.

TREATED GROUNDWATER RECHARGE/REINJECTION PROGRAM

Program Objective
The objective of the Treated Groundwater Recharge/Reinjection Program is to encourage the reuse or recharge of treated groundwater from contamination cleanup sites in order to enhance cleanup activities and protect the County's groundwater resources.

Background
District Resolution 94-84 encourages the reuse or recharge of treated groundwater from groundwater contamination cleanup projects and provides a financial incentive program to qualifying cleanup project sponsors. Sponsors must document that all non-potable demands are satisfied to the maximum extent possible prior to injecting any water into the aquifer. All injected water must be recovered by the pump-and-treat cleanup activities at the site.

Each application is processed within 45 working days. Once an applicant has met the qualifying conditions and is accepted, a legal contract is prepared and signed by the District and the clean-up project sponsor. This contract details how the sponsor will

receive a financial incentive from the District. The sponsor is responsible for providing periodic updates on the amount and quality of water reinjected/recharged.

Current Status
The amount of this financial incentive is equivalent to the basic groundwater user rate. IBM (San Jose) is currently recharging between 900 and 1,000 af per year, and is the only approved sponsor currently injecting/recharging groundwater and receiving this financial incentive.

Future Direction
Any future applications will be evaluated rigorously with respect to overall groundwater basin management to ensure that the groundwater basin will not be adversely impacted.

WATER USE EFFICIENCY PROGRAMS

The District's Water Use Efficiency Programs are designed to promote more effective use of the County's water supplies. The District's demand management measures are described in the Water Conservation and Agricultural Water Efficiency sections that follow the discussion of Recycled Water. The District's commitment to increasing the use of recycled water within the County will also help the District to more effectively use the County's water.

Recycled Water

Program Objective
The objective of the Recycled Water Program is to increase the use of recycled water, thereby promoting more effective use of the County's water supplies. To meet this objective, the District is forming partnerships with the four sewage treatment plant operators in the County and is taking every opportunity to expand the distribution and use of tertiary treated recycled water for non-potable uses. Present efforts focus on planning for future uses in agriculture, industry, commercial irrigation, and indirect potable reuse. To meet the objective of increasing the use of recycled water, the District is:

- Partnering with and providing rebates to the South Bay Water Recycling Program (SBWRP) which includes the cities of San Jose, Santa Clara and Milpitas.

- Operating and expanding the South County Recycled Water System as the recycled water wholesaler in the area. Formal agreements with the recycled water producer, the South County Regional Wastewater Authority (SCRWA), and the recycled water retailer, the City of Gilroy, are in place.

- Providing the City of Sunnyvale a rebate on the recycled water delivered each year.

- Meeting with the City of Palo Alto and their stakeholder group to help plan for expanded future use of recycled water in the North County.

- Contracting a consultant to perform a feasibility study on Advanced Treated Recycled Water.

Background

The District has been involved in water recycling since the 1970s when it supported research in Palo Alto and partnered in the establishment of the South County distribution system in Gilroy. Since the early 1990s, the District has become involved in an ever-increasing role. Recycled water use in the County has grown from about 1,000 af in 1990 to over 6,000 af in the year 2000. To encourage the use of recycled water, in 1993 the District started providing rebates to agencies delivering recycled water.

The largest system for recycled water distribution is the South Bay Water Recycling Program, which has over 60 miles of distribution pipelines and serves over 300 customers. The District continues a partnership with the SBWRP in its planning effort for expansion. In 1999, the District formalized its partnership with the South County Regional Wastewater Authority and the cities of Gilroy and Morgan Hill to plan and operate the recycled water distribution system in South County. Since then, the District has begun construction on major pumping and reservoir facilities to modernize the system.

Current Status

The District is expanding its planning efforts and is continuing discussions with the SBWRP for expanding the use of recycled water. This will involve transporting recycled water south from the existing pipeline in south San Jose in order to supply agricultural and industrial customers that now use groundwater or untreated surface water. The City of San Jose, who administers the SBWRP, has installed several groundwater monitoring wells at the District's request in order to monitor potential changes in groundwater quality as a result of the application of recycled water for irrigation.

The District continues to modernize and expand the South County Recycled Water System. Besides serving golf courses and parks, expansion of this system will involve delivering water to industrial and agricultural users. District staff has inventoried the volume of use and location of the largest groundwater and surface water users in the area and is beginning a marketing study for expansion of the system. The District is also working with the City of Gilroy to plan for the connection of new large water use developments to the system.

A project has been initiated to study the feasibility of installing a pilot plant for the advanced treatment of recycled water for use in agriculture, commercial irrigation, industry, and possibly for future streamflow augmentation and groundwater replenishment.

Future Direction

The future direction of the recycled water program is driven by District Board policy, which directs staff to increase recycled water use to 5% of total water use in the County by the year 2010 and to 10% of total use by the year 2020. To meet this goal, it is assumed that a countywide network of recycled water distribution systems will be

developed. The initial stage will provide for a major transmission main from the area of south San Jose in the SBWRP service area to the major commercial and agricultural customers in South County. Developing advanced treatment methods and facilities to provide recycled water of a higher quality standard than the present tertiary treatment will be required in order to meet the needs of some potential customers. Methods and facilities to blend recycled water with untreated surface water and with groundwater will also need to be developed in order to provide for peaking factors and the quality requirements of some customers. Additional research on the most effective method of advanced treatment and ways to develop more industrial use and onsite treatment of recycled water will be performed.

District efforts to expand recycled water use within Santa Clara County will be coordinated with the District's Integrated Water Resources Plan which will evaluate the various options for obtaining the additional water the County will require in future years. This effort will evaluate the comparative costs and benefits of recycled water, water conservation, water banking, and water transfers. District staff will work with partnering agencies to ensure that any potential uses of recycled water will not adversely impact the groundwater basin or recharge and extraction capabilities.

Water Conservation Programs

Program Objective

The objective of the Water Conservation Program is to promote more efficient use of the County's water resources and to reduce the demands placed on the District's water supplies. To meet this objective, the District has implemented a variety of programs designed to increase water use efficiency in the residential, commercial, industrial, and agricultural sectors, which all rely, in part, on extraction from the groundwater basin.

Background

The District's Water Conservation Program has been developed in large part to comply with the Best Management Practices (BMPs) commitments, defined in the 1991 Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California. The program targets residential, commercial/industrial/institutional, and agricultural water use.

The District has promoted conservation of the County's water supplies since its creation. However, a series of drought years between 1987 and 1992 prompted the District and local water retailers to significantly increase conservation efforts. The District enjoys a special cooperative partnership with the water retailers in regional implementation of the BMPs; several program elements were developed in partnership with the local water retailers. Water retailers have partnered with the District in marketing efforts for cooperative programs and in the distribution of water-saving devices such as showerheads and aerators.

Current Status

The Water Conservation Program has designed programs aimed specifically at residential, commercial, and agricultural users. Residential programs include:

- Water-Wise House Call Program designed to measure residential water use and provide recommendations for improved efficiency.
- Showerhead/Aerator Retrofit Distribution Program, which provides free showerheads and aerators to replace less efficient devices.
- Clothes Washer Rebate Program for the installation of high-efficiency washing machines.
- Landscape workshops focused on water efficient landscape and irrigation design.
- Ultra-Low-Flush Toilet (ULFT) Program (free or low-cost).
- Multi-Family Submeter Pilot Program aimed at reducing water use in multi-family dwellings.
- Education programs in English and Spanish, including the distribution of literature, promotion of water conservation at organized events, and the survey program.

District programs targeting water conservation in the commercial sector include:

- Irrigation Technical Assistance Program (ITAP) designed to help large landscape managers improve irrigation efficiency through free site evaluations.
- Commercial Clothes Washer Rebate Program, in conjunction with PG&E, San Jose/Santa Clara Water Pollution Control Plant, and the City of Santa Clara.
- Project WET (Water Efficient Technologies), which offers rebates to commercial and industrial customers for the reduction of water use and wastewater discharges (in conjunction with the City of San Jose).
- Ultra-Low-Flush Toilet Retrofit Program in conjunction with the San Jose/Santa Clara Water Pollution Control Plant.
- Irrigation Submeter Program to encourage better water management at large commercial sites.

The District has also implemented several programs to promote water use efficiency in the agricultural sector, which relies mainly on the groundwater basin for its water needs. These programs are discussed in the following section of this report.

In fiscal year 1999/2000, the District's water conservation programs achieved an estimated water savings of over 24,000 af, which includes 10,000 af through water retailer participation.

Future Direction

Water conservation efforts are anticipated to reduce County water demands by approximately 30,000 af in 2001, and by almost 32,000 af in 2002. Future programs and projects being developed include:

- Water Use Efficiency Baseline Survey to provide specific information needed to tailor the District's water use efficiency program to result in effective long-term water use efficiency, to evaluate the impacts of water efficiency measures, and further promote and implement Best Management Practices (BMPs).

- Expansion of the Water Efficient Technologies (WET) Program to the entire county.

- Landscape and Agricultural Area Measurement and Water Use Budgets.

Agricultural Water Efficiency

Program Objective

The objective of the Agricultural Water Efficiency Program is to promote, demonstrate and achieve water use efficiency in the agricultural sector, which relies on groundwater supplies for most of its water needs. To meet this objective the District has implemented the following program elements:

- Mobile Lab Program

- California Irrigation Management Information System (CIMIS) Program

- Outreach Program

Background

As required by the Central Valley Project Improvement Act, in 1994 the District adopted a Water Conservation Plan to comply with U.S. Bureau of Reclamation criteria. This plan commits the District to support various agricultural water management activities and to implement the urban BMPs discussed in the Water Conservation Programs section.

Among the agricultural water management activities outlined in the plan is a Mobile Irrigation Lab program. This program provides local farmers with on-site irrigation system evaluations and recommendations for efficiency improvement. The mobile lab is designed to help increase water distribution uniformity and on-farm irrigation and energy efficiencies for all types of irrigation systems. Proper distribution uniformity can result in lower water and energy bills and decreased fertilizer application. Managing nitrogen and irrigation input to more closely match actual crop needs can also reduce water and

energy bills; this approach reduces the potential for nitrate to leach into groundwater while maintaining or improving agricultural productivity.

California Irrigation Management Information System (CIMIS) is a related program that helps large-scale water users to develop water budgets for determining when to irrigate and how much water to apply. Created in 1982 through a joint effort of UC Davis and the Department of Water Resources (DWR), CIMIS is a network of more than 100 computerized weather stations across the state that collects, measures and analyzes all the climatological factors that influence irrigation. This information provides major irrigators daily data on the amount of water that evaporates from the soil and the amount used by grasses.

The District owns and supervises two CIMIS weather stations, one at the UC field station in downtown San Jose, and the other at Live Oak High School in Morgan Hill. Both of these stations, as well as others around the state, are connected to a central computer run by the DWR in Sacramento. The updated information from the District's two stations is automatically downloaded and then provided to the public via a telephone hotline recording or the Internet.

An Outreach Program is an essential component of the agricultural efficiency programs. Outreach to the agricultural community includes public information dissemination, seminars or workshops, public presentations, newsletter articles and specific program materials.

Current Status

The District continues to implement the Mobile Lab Program, which provides on-farm irrigation evaluations, pump efficiency tests, nitrate field test demonstrations, and recommendations for efficient irrigation improvements. Approximately 30 sites participate in the program each year.

The District is currently assessing the potential need for an additional CIMIS station in the North County.

As part of the Outreach Program, significant work has been channeled into developing educational materials on the use of CIMIS in efficient irrigation scheduling. Presentations on the various program elements have been made to the District's Agriculture Advisory Committee, Farm Bureau and grower associations. Articles and brochures have been developed for CIMIS and the mobile lab program. In addition, the staff from the District's Water Use Efficiency and Groundwater Management Units have worked together to hold various workshops and seminars in the South County on irrigation and nutrient and pesticide management. All seminars have been well attended.

Future Direction

The future direction of the agricultural water efficiency programs includes the continuation and further development of the Mobile Lab Program. District staff will recommend continuation of the program as long as it demonstrates its cost-effectiveness.

The District is currently evaluating the feasibility of implementing a financial incentives program to complement the mobile lab.

A Monitoring and Evaluation Program is necessary to determine and assess the effectiveness of the various programs. The focus of the current monitoring effort has been the tracking of activity levels and program costs. To ensure that future water saving goals are achieved and urban and agricultural programs are successful, the District will need to enhance its existing monitoring program to more rigorously quantify actual water savings.

INTEGRATED WATER RESOURCES PLAN

Program Objective

The objective of the Integrated Water Resources Plan (IWRP) is to develop a long-term, flexible, comprehensive water supply plan for the County through year 2040 that incorporates community input and can respond to changing water supply and demand conditions.

Background

The District's 1975 water supply master plan identified the Federal San Felipe Project as the best solution to meet future water demands. However, recent severe droughts, changing state and federal environmental and water quality regulations, and the variability and reliability of both local and imported supplies underscored the need for an updated, more flexible water supply planning process. In the early 1990s, District staff developed a water supply overview study and began to outline a process to update the 1975 master plan.

The overview study described the District's water system and identified drinking water quality issues, the County's water needs, existing water supplies, projected water supplies, potential water shortages, and other components for managing water supplies. The overview study also evaluated water supply alternatives and recommended a stakeholder process to help the District select the preferred alternative.

As a result of the recommendations from the water supply overview process and several workshops involving the Board and overview study project team, the District Board of Directors authorized staff to undertake the IWRP.

In March of 1996, the project team introduced the Board's planning objectives for the IWRP evaluation of water supply strategies. These objectives were refined by stakeholders, including: the general public, representatives of business, community, environmental and agricultural groups, District technical staff, and officials of local municipalities and other water agencies. Stakeholders used these objectives to evaluate various water supply strategies and agree upon an IWRP Preferred Strategy.

The IWRP Preferred Strategy aims to maximize the District's flexibility to meet actual water demands, whether they exceed or fall short of projections. It relies on water

banking, recycled water, demand management, and water transfers, plus "core elements" designed to ensure the validity of baseline planning assumptions, monitor or evaluate resource options, and help meet planning objectives. The Board approved the preferred strategy in December of 1996**.**

The groundwater basin is a critical component in the management of the County's water supply. The basin treats, transmits, and stores water for the County. The management objective of the 1996 IWRP is to maintain the highest storage possible in the three interconnected subbasins (or to bank groundwater) without creating high groundwater problems. During dry periods when local and imported water supplies do not meet the County's water needs, stored groundwater is used to make up the difference. However, the use of this storage has to be balanced with the potential occurrence of land subsidence.

Land subsidence has been a great concern in the valley. As much as thirteen feet of subsidence occurred in parts of the basin before subsidence was minimized through recharge activities and imported water deliveries. If subsidence were to recommence, the damage to infrastructure would be significant, as many levees, pipelines, and wells would need to be rebuilt. Therefore, the IWRP must balance the use of the groundwater basin with the avoidance of adverse impacts.

Current Status

The preferred strategy from the 1996 IWRP is being implemented. Action on several elements of the plan that has already taken place includes the following:

Water Banking

The District reached an agreement with Semitropic Storage District to bank up to 350,000 af in their storage facilities. The District currently has stored about 140,000 af in the water banking program.

Recycled Water

The District is working closely with the city of San Jose and Sunnyvale to develop and market recycled water in lieu of groundwater pumping for irrigation. Planning with South County Regional Wastewater Agency is also occurring (see section on Water Use Efficiency).

Demand Management

The Water Use Efficiency Unit has developed an aggressive program to minimize water use and provide assistance to irrigators to improve the efficiencies in their irrigation systems (see section on Water Use Efficiency).

Water Transfers

In 1999, the District entered into a multi-party water transfer agreement for an agricultural supply from a Central Valley Project (CVP) contractor. This transfer will make a small amount of dry year water available to the District during the next 20 years.

Core Elements

- In 1997, the District entered into a Reallocation Agreement that provides a reliability "floor" of 75 percent of contract quantity for the District's Municipal and Industrial CVP supply, except for extreme years when CVP allocations are made on the basis of public health and safety.

- A study was recently conducted to determine the frequency of critical dry periods using a statistical approach that showed the preferred strategies are very robust although not perfect.

- The Operational Storage Capacity of the Santa Clara Valley Subbasin was evaluated and refined in 1999 (SCVWD, 1999) – see section on operational storage capacity.

Future Direction

An ongoing process of monitoring the baseline conditions and contingency action levels is being developed. Updates to the IWRP are scheduled for every 3 to 5 years. The District is currently developing the 2002 IWRP Update.

As the District's water supply planning document through year 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

Additional Groundwater Supply Management Activities

Groundwater Modeling

The District uses a three-dimensional groundwater flow model to estimate the short-and long-term yield of the Santa Clara Valley Subbasin and to evaluate groundwater management alternatives. Six layers are used to represent the subbasin, and changes in rainfall, recharge, and pumping are simulated. The model is used to simulate and predict groundwater levels under various scenarios, such as drought conditions, reduced imported water availability, or increased demand. The groundwater model also allows the District to evaluate the operational storage capacity (discussed below) in the Santa Clara Valley Subbasin.

In the future, a three-dimensional flow model similar to the one used in the Santa Clara Valley Subbasin will be developed for the Coyote and Llagas Subbasins, enabling the District to simulate groundwater conditions throughout the County.

Operational Storage Capacity Analysis

The operational storage capacity is an estimate of the storage capacity of the groundwater basin as a result of District operation. Operational storage capacity is generally less than the total storage capacity of the basin, as it accounts for operational constraints such as

available pumping capacity and the avoidance of land subsidence or high groundwater levels. Identifying a reasonable range for the amount of groundwater that can be safely stored in wet years and withdrawn in drier years is critical to proper management of the groundwater basin.

The operational storage capacity of the Santa Clara Valley Subbasin was evaluated (SCVWD, 1999) using the groundwater flow model and historical hydrology, which included two periods of severe drought. The key findings of the analysis were that:

- The operational storage capacity of the Santa Clara Valley Subbasin is estimated to be 350,000 af.

- The rate of withdrawal from the basin is a controlling function and pumping should not exceed 200,000 af in any one year.

- The western portion of the subbasin is operationally sensitive which requires the Rinconada Water Treatment Plant to receive the highest priority when supplies become limited.

In 2001, an analysis of the operational storage capacity for the Coyote and Llagas Subbasins was conducted (SCVWD, 2001). As the District does not currently have a groundwater model for these two subbasins, a static analysis was used. Unlike a groundwater model, a static analysis cannot simulate changes in recharge, pumping, or demand. Instead, the operational storage capacity was estimated as the volume between high and low groundwater surfaces, chosen to maximize storage while accounting for operational constraints such as high groundwater conditions. The draft estimate for the combined operational storage capacity of the Coyote and Llagas Subbasins ranges from 175,000 to 198,000 af. The District is working to narrow the range of estimates for operational storage capacity through further analysis.

Having an estimate of the amount of water that can be stored within the basin during wet years and withdrawn during drier times will continue to be critical in terms of long-term water supply planning. As hydrology, water demands, recharge, and pumping patterns change, the estimate of operational storage capacity will need to be updated.

Subsidence Modeling

Due to substantial land subsidence that has occurred within the Santa Clara Valley Subbasin, the District uses numerical modeling to simulate current conditions and predict future subsidence under various groundwater conditions. PRESS (Predictions Relating Effective Stress and Subsidence) is a two-dimensional model that relates the stress associated with groundwater extraction to the resulting strain in fine-grained materials such as clays. The District has calibrated the model at ten index wells within the subbasin, and has established subsidence thresholds equal to the current acceptable rate of 0.01 feet per year.

Chapter 4
GROUNDWATER MONITORING PROGRAMS

This chapter describes District programs that monitor the water quality, water levels and extraction from the groundwater basin. It also describes the District's land subsidence monitoring program. These programs provide data to assist the District in evaluating and managing the groundwater basin. Specifically, the groundwater and subsidence monitoring programs provide the data necessary for evaluating whether the program outcomes result in achievement of the groundwater management goal.

Future efforts in groundwater monitoring will include the annual development of a groundwater conditions report, which will contain information regarding groundwater quality, groundwater elevation, and land subsidence.

GROUNDWATER QUALITY MONITORING

Program Objective

The objective of the General Groundwater Quality Monitoring Program is to determine the water quality conditions of the County's groundwater resources. By monitoring the quality of the groundwater basin, the District can discover adverse water quality trends before conditions become severe and intractable, so that timely remedial action to prevent or correct costly damage can be implemented. In general, the District monitors groundwater quality to ensure that it meets water quality objectives for all designated beneficial uses, including municipal and domestic, agricultural, industrial service, and industrial process water supply uses.

Background

Groundwater quality samples have been collected in the County since the 1940s by the District and by others. In 1980, District staff reviewed the existing general groundwater quality monitoring program and recommended changes and enhancements. The recommended changes and enhancements included revising the monitoring well network, revising the list of water quality parameters to be measured, and collecting groundwater samples biennially (every other year). Groundwater samples were analyzed for general mineral and physical water quality parameters.

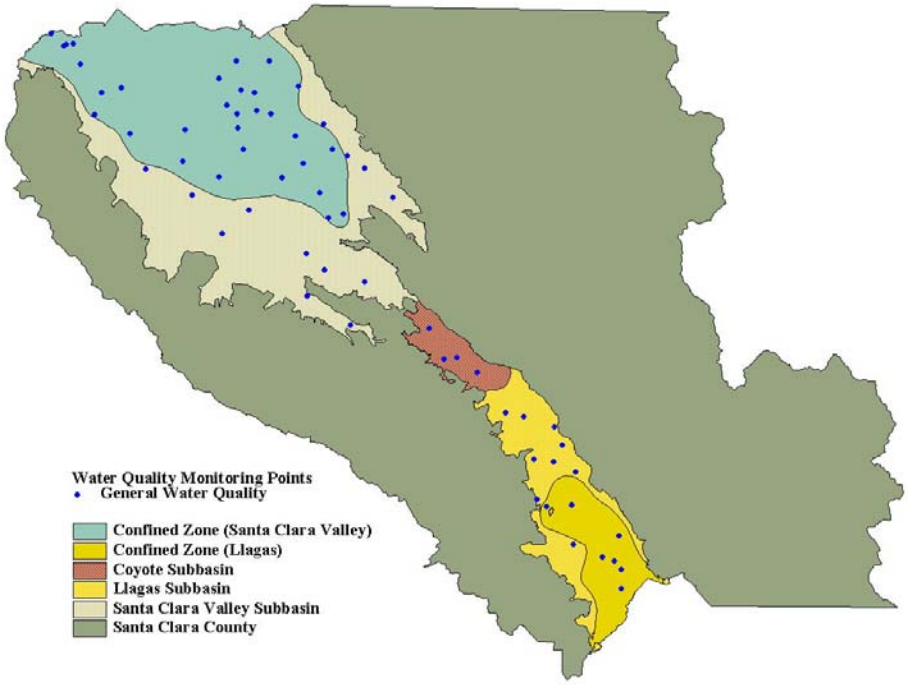
Current Status

The general groundwater quality monitoring program is designed to provide specific water quality data for each of the three subbasins (Figure 2-3). The monitoring well network includes one or more wells in each hydrographic unit yielding significant amounts of water. Groundwater samples collected from the monitoring network are intended to reflect the general areal and vertical groundwater quality conditions. Currently, the following program activities occur biennially:

- Water quality samples are collected from a monitoring network of approximately 60 wells (Figure 4-1).

- Samples are analyzed for general minerals, trace metals, and physical characteristics.
- Analytical results are evaluated, the database is updated, and routine water quality computations are performed.
- A summary report describing the water quality of the groundwater resources in the County is prepared.

Figure 4-1
Water Quality Monitoring Wells



In addition to the 60 wells monitored by the District for general groundwater quality analysis, the District monitors additional wells for special studies. There are currently approximately 100 wells monitored for MTBE, 60 wells monitored for nitrate, and 30 wells monitored for saltwater intrusion. The District also receives groundwater quality data for approximately 300 water retailer wells from the California Department of Health Services.

Monitoring results suggest that water quality is excellent to good for all major zones of the groundwater basin. This is based on comparing groundwater quality monitoring results to water quality objectives. Regional Water Quality Control Boards designed water quality objectives based on beneficial uses. Water quality objectives for municipal and domestic, industrial service, and industrial process water supply beneficial uses are equivalent to the drinking water standards established by the California Department of

Health Services. Water quality objectives for agricultural beneficial uses are defined specifically in the Regional Water Quality Control Boards' Water Quality Control Plans. Drinking water standards, agricultural water quality objectives, and monitoring results for common groundwater constituents are summarized in Table 2-2.

The more common trace constituents, which are considered unwanted impurities when present in high concentrations, are generally not observed in concentrations that adversely affect beneficial uses. Areas with somewhat degraded waters in terms of total mineral salt content have been identified in the Santa Clara Valley Subbasin and elevated nitrate concentrations have been observed in the Coyote and Llagas Subbasins. In addition, volatile organic compounds and other anthropogenic compounds have affected shallow aquifers in localized areas. Special groundwater monitoring programs have been developed to define the extent and severity of these problems and are discussed in Chapter 5.

Radon analysis was performed as a one-time special survey of current conditions and provided data for analyzing the potential impacts of upcoming drinking water standards for radon. The results of the 1999 sampling are presented in the 2000 General Groundwater Quality Monitoring report.

Future Direction

The General Groundwater Quality Monitoring Program utilizes relatively few, widely spaced monitoring points to assess large areas. Certain hydrographic units of the basin are only sparsely monitored at present. Staff is continuing to review the monitoring network to ensure that groundwater samples collected from the monitoring well network reflect areal and vertical groundwater quality conditions within each hydrographic unit. If it is determined that additional monitoring points are needed in some areas where there are no existing wells, District staff will recommend the installation of additional monitoring wells.

The District is also planning to increase the frequency of monitoring and the number of water quality parameters that are measured. Historically, the most frequent sampling frequency has been biennially. However, in order to parallel District efforts to better monitor performance in achieving desired results, the sampling frequency for the General Groundwater Quality Monitoring Program will be increased to annually. The number of water quality parameters that are measured will also be increased, so that samples are analyzed for volatile organic compounds, a significant concern in Santa Clara County. Samples will continue to be analyzed for general minerals, trace constituents, and physical characteristics.

The District will continue to assess and provide recommendations to address any adverse water quality trends that are observed through the General Groundwater Quality Monitoring Program. In addition, the District will continue to conduct special studies for specific contaminants as the need arises. As part of groundwater management planning, action levels and triggers will be developed for the constituents monitored.

The District will also begin developing annual groundwater conditions reports, which will summarize information regarding groundwater quality, groundwater elevation, and land subsidence.

GROUNDWATER ELEVATION MONITORING

Program Objective
The objective of the Groundwater Elevation Monitoring Program is to provide accurate and dependable depth-to-water field measurements for the County's major groundwater subbasins. By monitoring the groundwater elevations, the District can evaluate the groundwater supply conditions and formulate strategies to ensure adequate water supplies, prioritize recharge activities, and minimize any adverse impacts.

Background
Collecting depth-to-water information has been one of the District's functions since it was first formed as a water conservation district in 1929. Depth-to-water information is used to create groundwater elevation contour maps, which depict the conditions of the groundwater basin in the fall and spring of each year. Depth-to-water data are also used for subsidence modeling, to generate hydrographs needed to analyze groundwater model simulations, and to provide information to District customers on current and historical groundwater elevations.

Current Status
The District continues to collect depth-to-water field measurements, obtain depth-to-water measurements from other agencies and record that information for approximately 275 wells. Most wells in the current program are privately owned and their locations are fairly evenly distributed among the three subbasins (Figure 4-2). Current groundwater elevation monitoring includes the following:

- Collection of monthly depth-to-water field measurements from approximately 168 wells, including approximately 150 wells owned by other agencies (Figure 4-2).

- Collection of quarterly depth-to-water field measurements from approximately 108 wells (Figure 4-2).

- Maintenance of a groundwater elevation database.

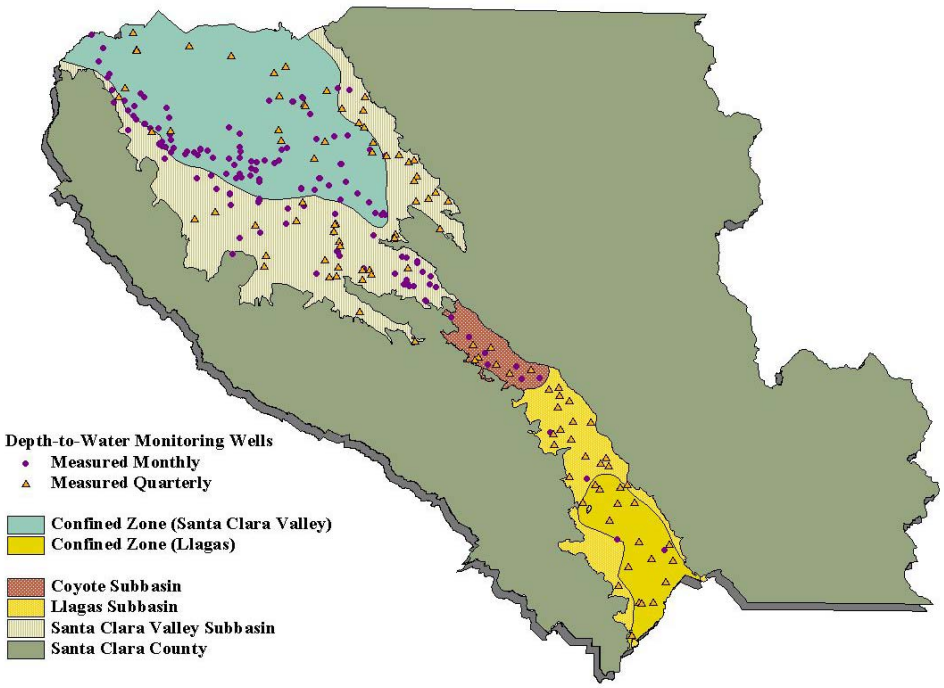
- Preparation of semi-annual groundwater level elevation contour maps.

The information in the District depth-to-water database is used regularly by District staff. Each year the District answers several hundred requests for depth-to-water information from other public agencies, consultants, and the public.

Future Direction
Although the District collects depth-to-water data from many wells throughout the County, most wells were designed as production wells, with perforations at multiple

intervals to increase groundwater extraction. There are relatively few wells that measure groundwater elevations in a single depth zone. The existing Groundwater Elevation Monitoring Program is currently being updated to target monitoring wells where discrete, depth-specific groundwater elevations can be obtained, which will enable better characterization of the three-dimensional groundwater system. A new groundwater elevation monitoring network has already been designed for the Santa Clara Valley Subbasin, and another project will be undertaken to develop a monitoring network for the Coyote and Llagas Subbasins by 2003.

Figure 4-2
Groundwater Elevation Monitoring Wells



The proposed network for the Santa Clara Valley Subbasin will include monitoring the individual piezometric pressures at the following 79 wells, which are geographically distributed among the hydrographic units in the subbasin. Specific recommendations include the:

- Continued monitoring of 31 depth-specific wells monitored in the existing depth-to-water program.
- Acquisition of 16 aquifer-specific wells from other organizations.
- Addition of 25 wells that are not part of the existing depth-to-water program.
- Installation of 7 new multiple-well monitoring sites to be constructed by 2003.

Monitoring these 79 wells will provide invaluable information to aid in characterizing depth-specific groundwater conditions. However, in addition to these 79 wells, monitoring of the wells in the current groundwater elevation network will continue indefinitely, as the water level data can be useful even though it cannot be attributed to specific depth zones. Monitoring is recommended on a quarterly basis during the months of January, April, July, and October, although some wells will be monitored monthly. A quarterly monitoring frequency is consistent with the historical groundwater level data in the basin, and is currently adequate in terms of current groundwater elevation monitoring needs. A change in monitoring frequency will be assessed if necessary.

The proposed monitoring network for the Santa Clara Valley Subbasin will be re-evaluated in 2003 to ensure that monitoring needs can be met with the wells proposed. A monitoring network for the Coyote and Llagas Subbasins will be developed by 2003.

Since groundwater information is continually utilized both within and outside the District, an online database that is easily accessible through the District's web site is being evaluated as it would significantly reduce District staff time spent in database maintenance and fulfilling depth- to-water data requests.

GROUNDWATER EXTRACTION MONITORING

Program Objective

The amount of groundwater extracted from the groundwater basin is recorded through the Water Revenue Program. Data produced by this program are used primarily to: 1) determine the amount of water used by each water-producing facility and collect the revenue for this usage, and 2) fulfill the provisions of Section 26.5 of the District Act which requires the District to annually investigate and report on groundwater conditions.

Background

The Water Revenue Program tracks groundwater, surface water, treated water and recycled water production within the District. The first collection of groundwater extraction data began shortly after the State Legislature authorized amendments to the Santa Clara County Flood Control and Water District Act in June 1965. As part of implementation of the District Act, wells within the District were registered. The District has been collecting groundwater extraction data from wells in the Santa Clara Valley Subbasin (also known as the North Zone or Zone W-2) since the early 1960s. After the merger with Gavilan Water Conservation District in 1987, this program expanded to the Coyote and Llagas Subbasins (the South Zone, or Zone W-5).

Current Status

To determine the amount of all water produced in the District, including groundwater, the Water Revenue Program:

- Develops and distributes water extraction statements to well owners within the two water extraction zones on a monthly, semi-annual, and annual basis.

- Audits incoming water extraction statements and completes field surveillance to ensure that water extraction information is accurate.
- Audits and invoices surface, treated and recycled water accounts.
- Assists the public in completing and filing water extraction statements.
- Maintains files for surface, ground, treated and recycled water accounts.
- Administers and maintains a database containing all water extraction information.
- Initiates and approves the installation of water measurement devices (meters) on water-producing wells.
- Registers (assigns state well numbers) and maps all water extraction wells.

Water extraction data is stored in an electronic database (Water Revenue Information System) and on paper. Program staff maintain accounts and records for more than 6,000 water extraction wells and approximately 27,000 monitoring wells. Staff provide information on these accounts to other District programs and outside customers, and provide other customer support as necessary.

Although approximately half of the wells within the County are not metered, metered wells extract the vast majority of groundwater used within the County. Where meters are not feasible, crop factors are used to determine agricultural water usage and average values adjusted for residences. Water meter testing and maintenance are performed on a regular basis. Maintenance is done to ensure meters are performing properly and accurately. When problems are discovered, meters are repaired or replaced. Meters are also replaced on a regular basis for testing and rebuilding.

The following table shows type of usage for wells in Zone W-2 (Santa Clara Valley Subbasin) and Zone W-5 (Coyote and Llagas Subbasins) and the number of meters recording usage.

Table 4-1
1998 Statistics on Extraction Wells

	North Zone (W-2)	**South Zone (W-5)**
Agricultural Wells	81	570
Municipal & Industrial Wells	1,875	350
Domestic Wells	567	2,569
Ag & M&I Wells	77	511
Total Number of Wells	2,600	4,000
Number of Metered Wells	1,017	395
Percentage of Metered Wells	40%	10%

In accordance with Section 26.5 of the District Act, the District prepares an annual Water Utility Enterprise Report, which contains the following information: present and future water requirements of the County; available water supply; future capital improvement, maintenance and operating requirements; financing methods; and the water charges by zone for agricultural and nonagricultural water. Recommended water rates are based on multi-year projections of capital and operating costs. Water charges can be used as a groundwater supply management tool, as the surcharge for treated water can be adjusted to encourage or discourage extraction from the groundwater basin.

Future Direction

Groundwater extraction monitoring data will continue to be important as a basis of groundwater management decisions and for groundwater revenue receipts. Program staff are currently evaluating the existing database and hope to convert the database into a relational database and link it to the newly developed Geographic Information System (GIS) based well mapping system. This will enable staff to evaluate groundwater use data geographically and to provide this data to groundwater management decision-makers in a meaningful and easy to use format.

LAND SUBSIDENCE MONITORING

Program Objective

The objective of the Land Subsidence Monitoring Program is to maintain a comprehensive system to measure existing land subsidence and to predict the potential for further subsidence.

Background

Land subsidence was first noticed in 1919 after an initial level survey conducted in 1912 by the National Geodetic Survey. At that time, 0.4 feet of subsidence was measured in downtown San Jose. Between 1912 and 1932, over 3 feet of subsidence were measured at the same location. As a result of this drastic increase in subsidence, an intensive leveling network was installed for periodic re-leveling to evaluate the magnitude and geographical extent of subsidence. From 1912 to 1970, cumulative subsidence measured at the same San Jose location totaled approximately 13 feet.

A cross-valley differential leveling survey circuit was run in the 1960s and continues to be conducted. The level circuit was conducted almost annually from 1960 through 1976, once in 1983, and annually from 1988 to the present.

In 1960, the United States Geologic Survey (USGS) installed extensometers, or compaction recorders, in the two 1,000-foot boreholes drilled in the centers of recorded subsidence sites in Sunnyvale and San Jose. The purpose for installing these wells was to measure the rate and magnitude of compaction that occurs between the land surface and the bottom of the well.

In the mid-1960s, imported water from San Francisco’s Hetch-Hetchy reservoir and the State Water Project’s South Bay Aqueduct played a major role in restoring groundwater

levels and curbing land subsidence. A combination of factors including imported water, natural recharge, decreased pumping and increased artificial recharge has reduced land subsidence to an average 0.01 feet per year.

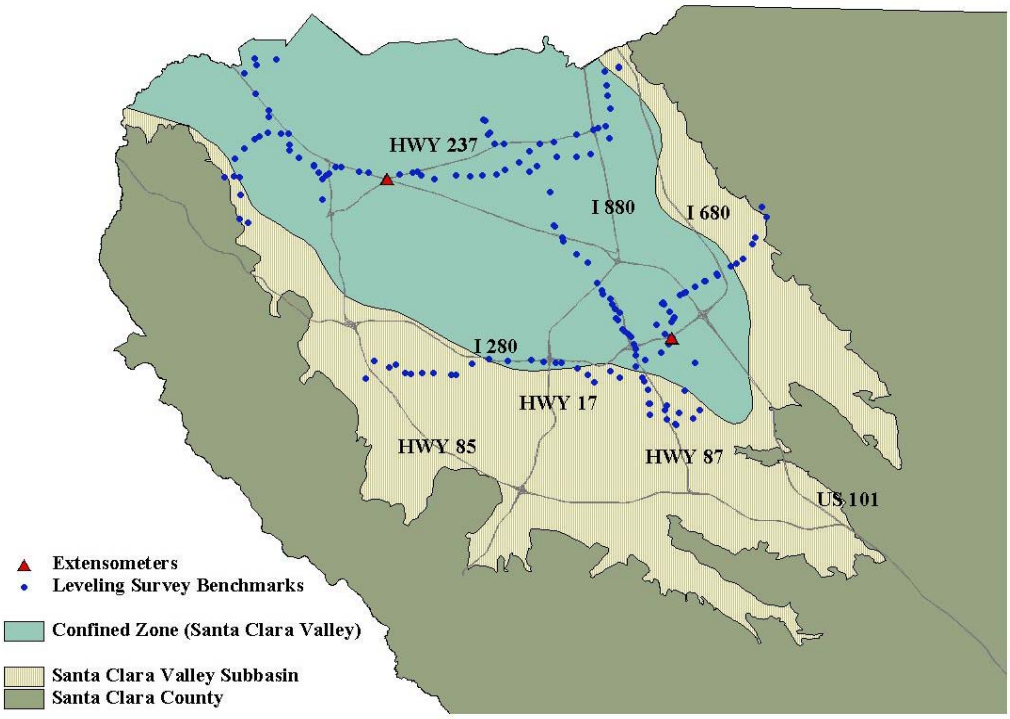
The District developed subsidence thresholds that relate the expected rate of land subsidence from various groundwater elevations. The Predictions Relating Effective Stress and Subsidence (PRESS) computer code was utilized for this model, and 10 index wells located throughout the Santa Clara Valley Subbasin were used as control points for the subsidence calibration and prediction.

Current Status

The existing land subsidence monitoring program includes the following:

- Monitoring land subsidence at two extensometer sites in San Jose and Sunnyvale (Figure 4-3).
- Conducting an annual leveling survey across three different directions in the valley to measure any land subsidence that may be occurring away from the extensometers (Figure 4-3).
- Analyzing data to evaluate the potential of re-initiating land subsidence.

Figure 4-3
Location of Extensometers and Leveling Survey Benchmarks



The extensometer in the San Jose site has recently been upgraded and equipped with monitoring and storage instrumentation to execute the data acquisition process electronically. Data collected from this site continues to be analyzed to determine any changes in the rate of land subsidence.

In 1998, the District entered into a cooperative agreement with the USGS to use Interferometric Synthetic Aperture Radar (InSAR) technology to measure any subsidence that may have not been captured in the existing monitoring program. This new technology compares satellite images taken at different times and reveals any changes in ground surface elevations with an accuracy of a few millimeters. INSAR covers the entire County, unlike traditional monitoring which is site-specific. Under the cooperative agreement, InSAR images were analyzed both seasonally and over a five-year period. Data from this study reasonably replicated and supported the data obtained from the District's extensometers.

The leveling survey continues to be conducted annually. A new leveling line was added to the leveling survey in 1998 as InSAR images indicated that additional information was needed along the Silver Creek Fault in San Jose.

Future Direction

Monitoring and data storage equipment have been installed at the San Jose extensometer site. Plans to enhance the land subsidence monitoring network program include the installation of new equipment to facilitate the monitoring and storage of data from the extensometer site in Sunnyvale, and the evaluation of datum stability at this site.

Through the 1998 study with the USGS, InSAR technology was proven able to reasonably replicate historical subsidence data from extensometers and the cross-valley leveling surveys. District staff will investigate the benefits of incorporating InSAR technology into the current land subsidence monitoring program.

The District will continue to utilize groundwater flow and subsidence models to simulate land subsidence as a result of different groundwater scenarios and groundwater management alternatives.

Chapter 5
GROUNDWATER QUALITY MANAGEMENT PROGRAMS

This chapter describes District programs that address nitrate management, saltwater intrusion, well construction and destruction, wellhead protection, leaking underground storage tanks, toxic cleanup, land use and land development review, and other groundwater protection issues. These programs help protect groundwater quality by identifying existing and potential groundwater quality problems, assessing the extent and severity of such problems, and preventing and mitigating groundwater contamination.

NITRATE MANAGEMENT

Program Objective

The objective of the Nitrate Management Program is to delineate, track and manage nitrate contamination in the groundwater basin in order to ensure the basin's viability as a long-term potable water supply. More specifically, the objectives are as follows:

- Reduce the public's exposure to high nitrate concentrations.
- Reduce further loading of nitrate.
- Monitor the occurrence of nitrate.

Background

The conversion of nitrogen to nitrate is a natural progression in the nitrogen cycle. In the form of nitrate, nitrogen is highly soluble and mobile. Due to its solubility and mobility, nitrate is one of the most widespread contaminants in groundwater. Unlike other compounds, nitrate is not filtered out by soil particles. It travels readily with rain and irrigation water into surface and groundwater supplies.

The amount of nitrate reaching the groundwater depends on the amount of water infiltrating the soil, the concentration of nitrate in the infiltrating water and soil, the soil type, the depth to groundwater, plant uptake rates, and other processes. Nitrate concentrations now observed in the groundwater basin might be a result of land use practices from several decades ago.

High concentrations of nitrate in drinking water supplies are a particular concern for infants. Nitrate concentrations above the federal and state maximum contaminant level (MCL) of 45 milligrams per liter (45 mg/L NO_3) have been linked to cases of methemoglobinemia ("Blue Baby Syndrome") in infants less than 6 months of age. In addition, public health agencies, including the California Department of Health Services, are conducting research to determine whether excess nitrate in food and drinking water might also have long term carcinogenic (tendency to cause cancer) or teratogenic (tendency to cause fetal malformations) effects on exposed populations.

Communities in the South County rely solely on groundwater for their drinking water supply. The District created the Nitrate Management Program in October 1991 to manage increasing nitrate concentrations in the Llagas Subbasin.

In June of 1992, an extensive study was initiated to review historical nitrate concentrations, identify potential sources, collect and analyze groundwater samples for nitrate, and develop a set of recommendations for the prevention and control of nitrate loading in South County. The results of the study, completed in February 1996, indicated that nitrate concentrations in the Llagas Subbasin are generally increasing over time and that elevated concentrations still exist throughout the subbasin.

In addition, the study found that there are many sources of nitrate loading in Llagas Subbasin. The major sources of nitrate are fertilizer applications, and animal and human waste generation. The southern portion of Santa Clara County has historically been an agricultural area. Only in recent years has agricultural acreage declined due to residential growth. However, due to the slow movement of surface water to the water table, residual nitrate concentrations in the soil from past practices may continue to contribute to increasing nitrate concentrations in the groundwater for several years or decades to come.

The specific recommendations of the study were the following: increase public education to reduce loading and exposure; blend water to reduce exposure; review and possibly revise the well standards; increase the level of regional wastewater treatment in order to reduce reliance on septic systems; increase point source regulation; conduct recharge feasibility studies; increase monitoring of the groundwater basin; and to consider alternative water supplies, treated surface water, water recycling and enhanced sewage treatment technologies for on-site systems.

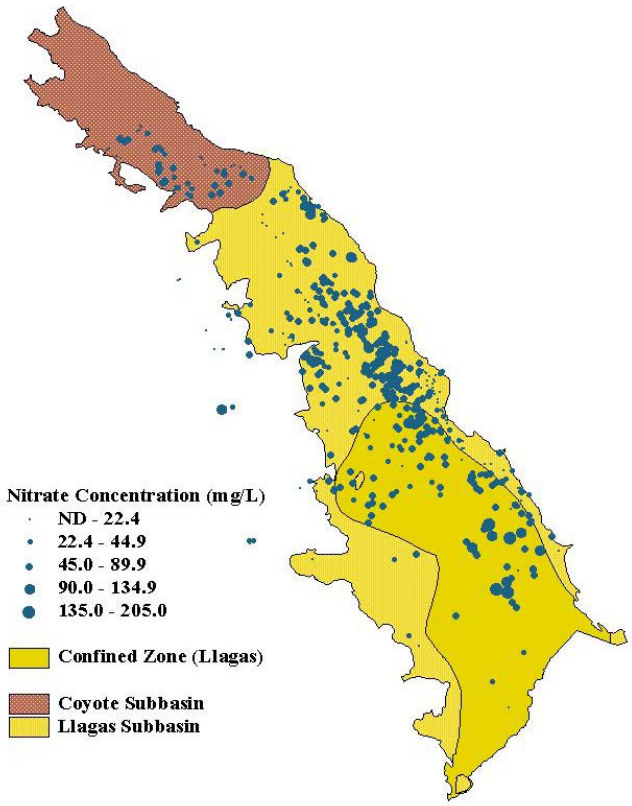
In 1997, the District began implementing the public education portion of the study recommendations. A large agricultural outreach effort was initiated. As part of that outreach, the District entered into a contract with a Mobile Irrigation Lab to offer free irrigation evaluations to farmers in order to improve the efficiency of their irrigation systems and scheduling. By improving the irrigation efficiency and distribution uniformity, the irrigators can reduce the amount of water and nitrate leached beyond the active root zone of the crop and into the groundwater. Over 250 people have attended seminars to increase their awareness of the mobile lab and to learn nitrate-sampling and nitrogen management techniques. Approximately 150 free soil nitrate test kits have been prepared and distributed. A series of 5 fact sheets on Nitrogen and Water Management in Agriculture was produced in cooperation with Monterey County Water Resources Agency and the Pajaro Valley Water Management Agency. English and Spanish versions have been distributed to the agricultural community through a series of seminars, mobile lab operators, other agricultural agencies and the on the District's new Agricultural web page.

To reduce exposure, reduce loading and monitor occurrence, a large-scale public outreach effort was launched offering a free nitrate analysis to all well water users in the Llagas and Coyote Subbasins. Approximately 2,500 residents were notified through

direct mailings about the program and the issues surrounding nitrate in drinking water. An unknown number were notified through newspaper, radio and television coverage. More than 600 private wells shown in Figure 5-1 have been tested for nitrate. Along with the results of the testing, residents were mailed a fact sheet describing what nitrate is, where it comes from, what the health effects are, how to prevent further loading and where to find more information.

Of the 600 private wells tested, more than half exceed the federal safe drinking water standard for nitrate. Of those that exceed the standard, half of the residents use an alternate water source or point-of-use treatment for their drinking water. The data also indicated that nitrate concentrations in the Llagas Subbasin continue to increase, that nitrate concentrations in the Coyote Subbasin have remained steady, and that high concentrations of nitrate are sporadically located throughout both subbasins. A report on the findings was produced in December 1998 and was distributed to several local and state agencies. These elevated nitrate levels were detected only in private wells; it should be noted again that public water supply wells within the County meet drinking water standards.

Figure 5-1
South County Nitrate Concentration

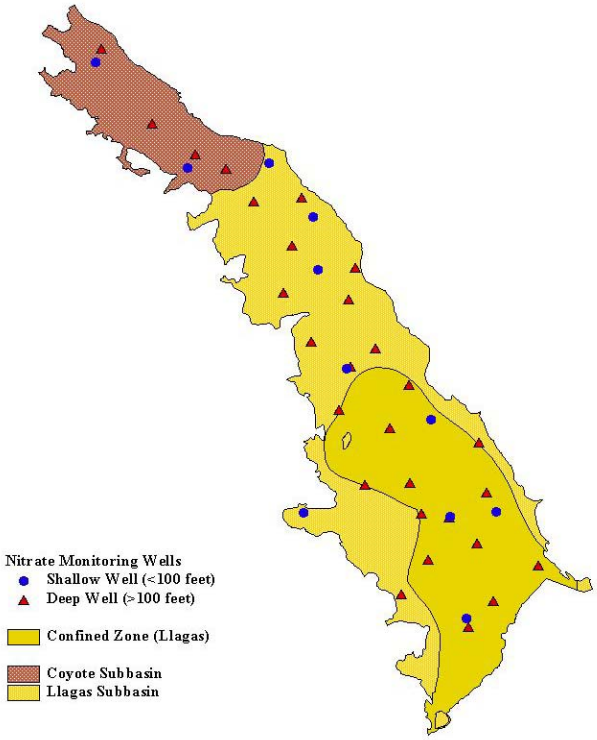


Current Status

To reduce nitrate loading, the District continues to schedule mobile lab evaluations and agricultural seminars. These seminars focus on how to apply irrigation water more efficiently and how to conduct soil testing for nitrate. In addition, the District is a cooperator on a grant with a soil scientist to establish field trials demonstrating and evaluating the effectiveness of in-field nitrate testing in drip and sprinkler irrigated vegetables.

To monitor nitrate occurrence, the District is conducting a comprehensive monitoring effort to track seasonal, areal, vertical and long-term trends in nitrate concentrations. The current monitoring program shown in Figure 5-2 consists of 42 deep groundwater wells (greater than 100 feet deep) and 15 shallow monitoring wells (less than 100 feet deep).The shallow monitoring wells will allow us to track what we might expect to see in the deeper wells in the future. Network wells are being monitored on a quarterly basis to track seasonal variations.

Figure 5-2
Current South County Nitrate Monitoring Network



To reduce nitrate exposure, the District is working with the Santa Clara County Department of Environmental Health to produce a well owner's guide. Among other things, the guide will contain information on recommended sampling, testing and disinfecting practices, as well as measures to protect against contamination.

Future Direction

Continued public education and outreach will remain the focus of the nitrate management program to reduce further loading and prevent possible exposure. If nitrate concentrations continue to increase at all depths, more extensive action may be required. The District may need to investigate alternate water supplies for the many private well water users in the area. Alternate water supplies could include a water treatment plant to remove the nitrate from the existing groundwater supply or the treatment of water from the San Felipe pipeline.

More research is needed to determine how much nitrate is contributed through the various manure management practices currently used. Best Management Practices (BMPs) for manure management need to be determined, and they need to be communicated to the public in a manner that will encourage adoption. More research is also needed regarding reduction of nitrate loading from septic systems; specifically, regarding whether the benefit of removing or reducing septic system loading justifies the economic and political cost of increasing sewer line connections.

To achieve the objective of monitoring nitrate occurrence, the District will continue to sample the existing monitoring network in the Llagas and Coyote Subbasins on a quarterly basis. Two years of quarterly data has been collected so far and staff are in the process of analyzing the data for seasonal, areal, and long-term trends. Staff is beginning a thorough evaluation of the extent and severity of nitrate contamination in the Santa Clara Subbasin, based on water quality data from the District's groundwater monitoring program and the water retailers.

The District may also investigate the feasibility of remediating nitrate contamination. There is some indication that nitrate concentrations around recharge facilities are lower than elsewhere. This finding would need to be confirmed as part of an investigation into reducing nitrate concentrations by additional recharge. Similarly, the District may be able to remediate nitrate contamination by setting up several pump and treat operations. High nitrate water would be pumped out of the basin, treated and injected back into the basin. Phytoremediation, which uses deep-rooted plants to draw the nitrate out of the vadose zone before it can reach groundwater, may be employed in some areas. A fourth possibility is reactive zone remediation where a reagent is injected into the system to intercept and immobilize or degrade the nitrate into a harmless end product. A thorough investigation of any remediation technology would need to occur before prior to its adoption.

SALTWATER INTRUSION PREVENTION

Program Objective

The objective of the Saltwater Intrusion Prevention Program is to monitor and to protect the groundwater basin from seawater intrusion.

Background

The movement of saline water into a freshwater aquifer constitutes saltwater intrusion. This potential exists in groundwater basins adjacent to the sea or other bodies of saline water. Intrusion of saltwater into a freshwater aquifer degrades the water for most beneficial uses and, when severe, can render it virtually unusable. Salty water can corrode holes in well casings and travel vertically to other aquifers not previously impacted. Once freshwater aquifers are rendered useless by a severe case of saltwater contamination or intrusion, it is extremely difficult and costly to reclaim them.

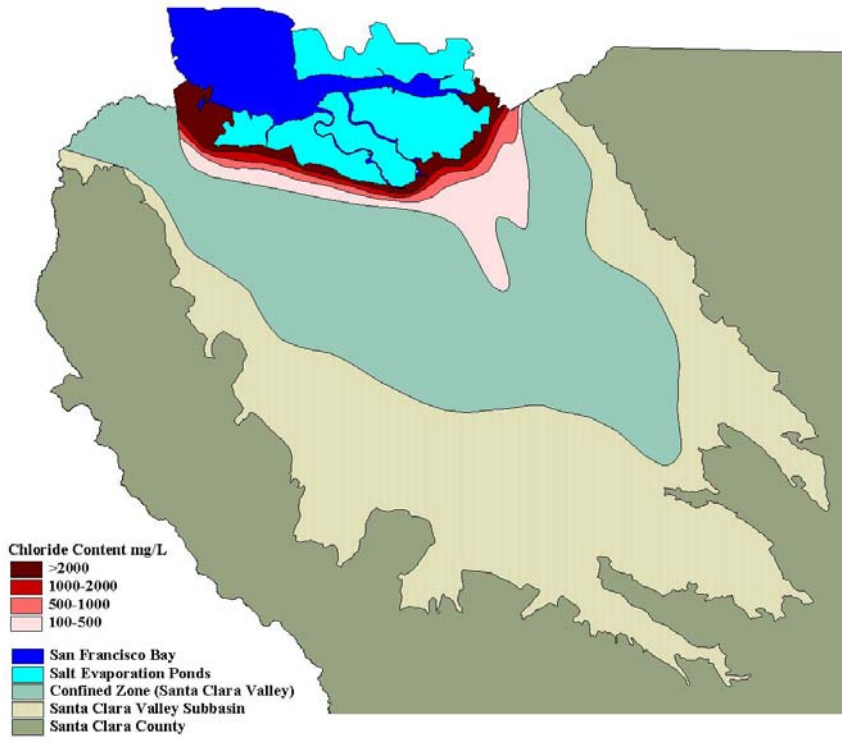
Comparison of older mineral analyses of groundwater from wells in the San Francisco bayfront area in Santa Clara and Alameda counties, some dating back to 1907, with more recent data shows that saltwater intrusion has occurred in the upper aquifer. With much higher water demands after World War II and the occurrence of land subsidence, saltwater intrusion conditions became aggravated and encompassed a portion of the baylands (the area adjacent to the southern San Francisco Bay). Bayshore Freeway (U.S. Route 101) and the Nimitz Freeway (Interstate 880) delineate the southern limits of this area.

The alluvial fill deposits of the Santa Clara Valley Subbasin in the flat baylands area consist of thin aquifers amongst abundant clays. The aquifers are broadly grouped into two water-bearing zones referred to as the “upper aquifer zone,” which usually occurs at depths less than 100 feet, and the “lower aquifer zone,” which usually occurs at depths greater than 150 to 250 feet, and which constitutes the potable aquifer system. Previous studies indicate the upper aquifer zone fringing San Francisco Bay is widely intruded by saltwater. The lower aquifer zone has pockets of small areas of elevated salinity associated with migration through abandoned wells.

Within the upper aquifer zone, the “classical case” of intrusion which occurs by displacement of freshwater by seawater and is indicated by total dissolved salt content over 5,000 mg/L, has progressed only a short distance inland from the bayfront, estuaries or salt evaporator ponds as shown in Figure 5-3. This intrusion had been induced when pumping of the upper aquifer and land subsidence reversed the hydraulic gradients, which had originally been toward the Bay. A large mixed transition zone precedes this intruding front with its outer limit arbitrarily defined by the 100 mg/L chloride line.

The greatest inland intrusion of the mixed transition water occurs along Guadalupe River and Coyote Creek. The large mixed transition zone is caused by saltwater moving upstream during the high tides and leaking through the clay cap into the upper aquifer zone when this zone is pumped. Land surface subsidence has aggravated the condition of intrusion by allowing farther inland incursion of saltwater up the stream channels from the Bay and by changing the gradient directions.

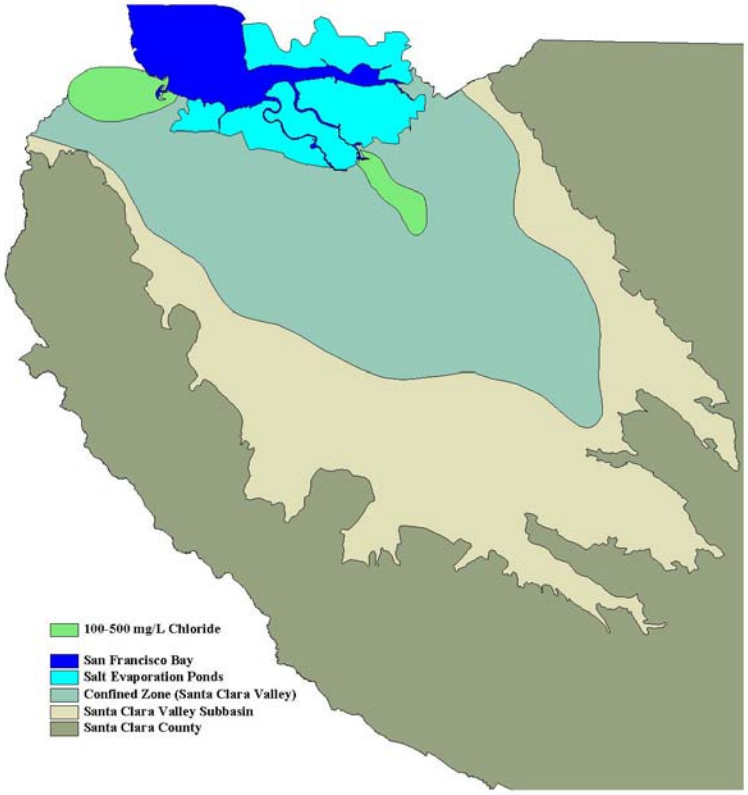
Figure 5-3
Upper Zone Saltwater Intrusion



Data has revealed a local area of high salt concentration in the upper aquifer zone in the Palo Alto bayfront area. This locally concentrated groundwater has moved inland historically and has the potential to continue farther inland. It is in this area that the District constructed a 2-mile-long hydraulic barrier in order to prevent further intrusion and to reclaim portions of the intruded aquifers.

The lower aquifer zone is only mildly affected; the area of elevated salinity encompasses a much smaller area than that of the upper aquifer zone (Figure 5-4). The contaminated lower aquifers lie beneath the intruded portion of the upper aquifer zone. The areal distribution and the variable concentration of the saltwater contamination with time imply that the intrusion into the lower aquifer occurred as seasonal slugs of contaminated water were induced from either the surface or the upper aquifer. As the clay aquitard between the upper and lower aquifer zones is essentially impermeable, the salinity in the lower aquifer zone is thought to have occurred through improperly constructed, maintained or abandoned wells. As a result of this finding, the operation of the hydraulic barrier was discontinued.

Figure 5-4
Lower Zone Saltwater Intrusion



The resumption of land surface subsidence is the greatest potential threat to aggravating the intrusion condition, as it would further depress the land surface fronting South San Francisco Bay. This would increase the inland hydraulic gradient relative to the classical intrusion front and expose a larger area of the upper aquifer zone to intrusion as a consequence of the greater inland incursion of tidal waters. A lowering of the piezometric level in the lower aquifers, which is related to the cause of subsidence, will also increase the potential for intrusion into the lower zone.

Current Status

As part of the Saltwater Intrusion Prevention Program, the defective wells in the northern Santa Clara Valley Subbasin along San Francisco Bay were to be located and destroyed. The District conducted an extensive program of locating and properly destroying these contaminant conduit wells. After these defective wells were located, the owners were required to properly destroy them under District ordinance, or by litigation if necessary. From District records, a list of 45 defective wells to be destroyed was generated.

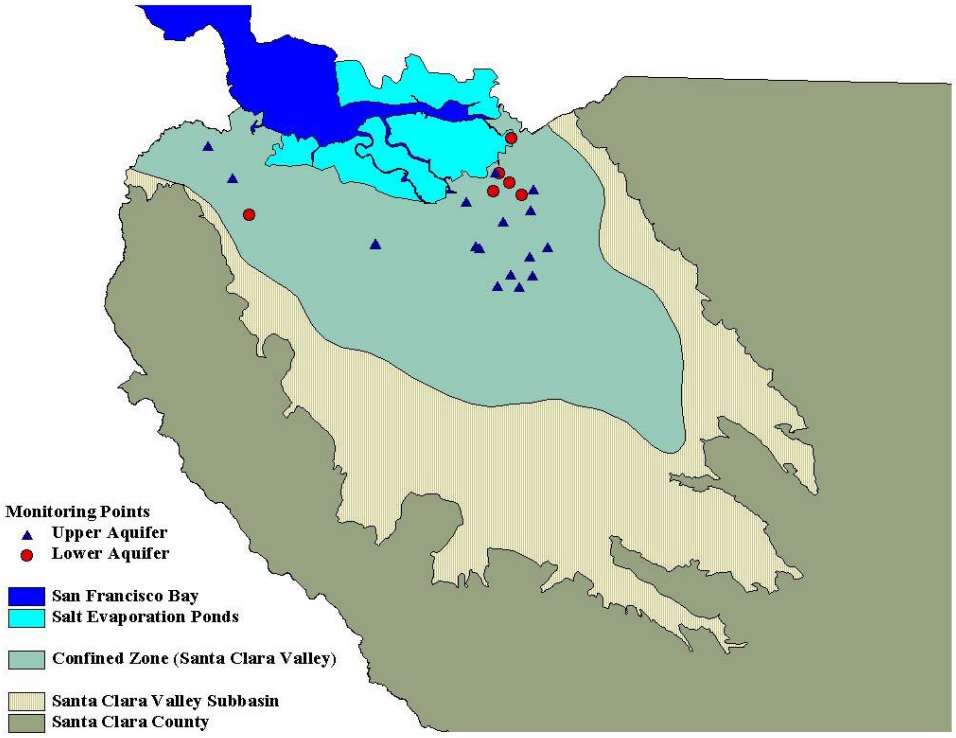
Since the inception of this program, the Board has authorized a more comprehensive well destruction program, through which abandoned wells near areas of known chemical contamination can be destroyed with District funds. This program began in October 1984, and was in part a result of general concerns about contamination of useable aquifers by saltwater as well as by industrial chemicals throughout the County. Several

wells in the area were included in this parallel program, many of which were not identified as defective or potential conduit wells.

Of the 45 potential conduit wells, six were removed from the list as they do not appear to be acting as conduits. In 1985, the District's Groundwater Protection Section pursued destroying the remaining 39 wells through District Ordinance No. 85-1. This ordinance gives the District authority to require owners of wells determined to be "public nuisances" to destroy the wells or to upgrade them to active or inactive status. Of the 39 potential conduit wells identified, 10 were not located and were presumed destroyed without a permit. The remaining wells were all properly destroyed.

The District continues to monitor the extent and severity of saltwater intrusion. The current Saltwater Intrusion Monitoring Program consists of 21 monitoring wells that are sampled quarterly as shown in Figure 5-5. Five of these wells monitor the status of saltwater intrusion in the lower aquifer zone, while the remaining 16 wells monitor the upper aquifer zone. Originally, the program consisted of 25 wells. Eight of these wells could not be located during recent field investigations and presumably were destroyed by the owners. However, work is commencing to replace the lost wells with District-owned wells and restore the monitoring program to its original form.

Figure 5-5
Saltwater Intrusion Monitoring Locations



Future Direction

The present status of the Saltwater Intrusion Prevention Program is subject to change, depending upon the future basin operation and groundwater demand in the area. The two economically practical ways to prevent or minimize any further intrusion are through management of the groundwater basin and strict enforcement of ordinances on well construction and destruction standards. These approaches have been adopted by the District and should continue to be implemented.

Saltwater intrusion continues to be monitored. Monitoring data are stored by electronic and conventional means. Electronic storage consists of a geographically referenced database of monitoring wells and a related database of water quality information. Conventional storage consists of filing hard copies of laboratory analytical reports in the appropriate well folders and providing data to DWR. Biennial evaluations of the data are documented in the General Groundwater Quality Monitoring Program reports. The monitoring program, including well location and sampling frequency, will be evaluated with respect to long-term groundwater quality protection strategies and overall basin management.

WELL CONSTRUCTION/DESTRUCTION PROGRAMS

Well Ordinance

Program Objective

The objective of the Well Ordinance Program is to protect the County's groundwater resources by ensuring that wells and other deep excavations are constructed, maintained and destroyed such that they will not cause groundwater contamination. To meet this goal, the Well Ordinance Program:

- Develops standards for the proper construction, maintenance, and destruction of wells and other deep excavations.
- Educates the public, including contractors, consultants and other government agencies about the Well Ordinance and the Well Standards.
- Verifies that wells are properly constructed, maintained and destroyed using a permitting and inspection mechanism.
- Takes enforcement action against violators of the well ordinance.
- Maintains a database and well mapping system to document information about well construction and destruction details, a well's location, and well permit and well violation status.

The scope of the Well Ordinance Program includes all activities relating to the construction, modification, maintenance, or destruction of wells and other deep excavations in the County.

Background

In the late 1960s, following post-war industrialization and development of Santa Clara County, it became apparent that abandoned or improperly constructed wells and other deep excavations (e.g. elevator shaft pits) are potential conduits through which contaminants can travel from shallow, potentially contaminated aquifers, to deeper drinking water aquifers. Recognizing this, in 1971, a District advisory committee consisting of representatives from local agencies, the District, and the Association of Drilling Contractors, was established.

The committee was charged with the development of well construction standards and standards for the proper destruction of abandoned wells. The Board adopted standards for well destruction and construction in October 1972 and January 1975, respectively. In 1975, the District Board of Directors passed the first District Well Ordinance.

Both the Standards and the Well Ordinance have undergone numerous revisions. The most recent version of the well standards, the *Standards for the Construction and Destruction of Wells and Other Deep Excavations in Santa Clara County*, was adopted by the Board in July 1989. The Board passed district Well Ordinance 90-1 in April 1990. These documents address the permitting and proper construction and destruction of wells and other deep excavations, including water supply wells, monitoring wells, remedial extraction wells, vadose wells, cathodic protection wells, injection wells, storm water infiltration wells and elevator shaft pits.

Beginning in 1975, well construction and destruction permits were required by the District and the District began inspecting every well that was constructed. Well destruction activities were first inspected by the District in 1984.

Since the inception of well permitting, the annual number of permits issued has greatly increased. The District issued approximately 400 well permits in 1976, the first full year of permitting, to a maximum of approximately 2,544 permits in 1994.

The District is in compliance with Sections 13803 and 13804 of the State Water Code and thereby has the authority to assume the lead role in the enforcement of the State Well Standards, the assignment of State Well Numbers, and the collection of State Drillers Reports for all wells constructed or destroyed in Santa Clara County.

Current Status

To date, the District has permitted and inspected the construction of approximately 3,000 water supply wells, 22,000 monitoring wells, 4,000 exploratory borings, and the destruction of 9,500 wells under the Well Ordinance Program.

The District has recently completed converting the paper-based well maps to a GIS based well mapping system.

Future Direction
In order to continue protecting the District's groundwater resource, the District will continue implementation of the program and will continue to regulate the construction and destruction of wells in the County. District staff will re-write District's well standards and ordinance to address recent changes in well construction and destruction techniques. District staff is also currently evaluating District's existing well information database and would like to convert the database into a relational database format and link it to the newly developed GIS based Well Mapping System.

Dry Well Program

Program Objective
The objective of the Dry Well Program is to minimize the impacts of dry wells on groundwater quality. The main objectives of this program are to:

- Control installation of new dry wells.
- Destroy existing dry wells that have contaminated or may contaminate groundwater.
- Educate planning agencies and the public about the threat that dry wells pose to groundwater quality.

Background
Dry wells, also known as storm water infiltration devices, are designed to direct storm water runoff into the ground. Storm water runoff can carry pollution from surface activities. Because dry wells introduce runoff directly into the ground, they circumvent the natural processes of pollution breakdown and thereby increase the chance of groundwater contamination. Additionally, dry wells have been sites of illegal dumping of pollutants.

In Santa Clara County, at least 8 serious contamination sites were caused or aggravated by the presence of dry wells introducing contamination into the groundwater. One dry well site has a solvent plume more than 2,000 feet long and more than 200 feet deep in a recharge area of South County where the only source of drinking water is groundwater.

In 1974, the Environmental Protection Agency (EPA) developed the Underground Injection Control Program under the Safe Drinking Water Act. The program requires the owners and operators of all shallow drainage wells to submit information regarding the status of each well to the EPA. The Regional Board adopted the "Shallow Drainage Wells" amendment to the Basin Plan in 1992. The Basin Plan amendment requires the local agency to develop a shallow drainage well control program that would locate existing shallow wells and establish a permitting program for existing and new wells.

In 1991, the District and municipal agencies began development of a Storm Water Infiltration Policy to satisfy Regional Board requirements. In August 1993, the District adopted Resolution 93-59 regarding Storm Water Infiltration Devices.

Current Status
Since 1993, owners of dry wells deeper than 10 feet have been required to register their wells by filing a "Notice to Continue Use" with the District. Dry well owners can continue using their wells as long as the well is not an immediate threat to groundwater quality. Local cities, businesses, contractors and private citizens regularly call for District guidance on dry wells.

The District continues to issue permits for dry wells greater than 10 feet deep and for the destruction of dry wells. District staff advise the public and planning agencies about the appropriate use of dry wells to mediate storm water problems generally and on a case-by-case basis. District staff continue to work with local programs to clarify the District dry well policy. Local inspecting agencies continue to work with the District to locate and register dry wells.

Future Direction
The Dry Well Program is being incorporated into the Well Ordinance Program. Specific standards for dry wells will be incorporated into the next revision to the Well Standards. These standards include prohibiting the construction of dry wells greater than 10 feet deep and defining dry wells to include all shallow drainage wells, not just shallow drainage wells receiving storm water. The purpose of revising the program to incorporate it into the Well Ordinance Program is to clarify permitting and construction standards for dry wells, to expand the definition of devices covered by the Well Standards so that all wells that bypass natural protection processes are subject to standards for protecting groundwater, and to simplify the process by which dry wells are permitted.

Abandoned Water Well Destruction Assistance

Program Objective
The objective of the Abandoned Well Destruction Assistance Program is to protect the County's groundwater resources by helping property owners properly destroy old, abandoned water supply wells that they have discovered.

To meet the program's objective, the District:

- Passed a Board Resolution (94-87) allowing District assistance to property owners who discover abandoned wells.
- Enters into annual contracts with well drillers to complete work associated with the project.
- Destroys abandoned wells for property owners.

Background
Due to the agricultural history of the County and to subsequent post-World War II development, many former water supply wells were abandoned and buried and remain

potential vertical conduits that may transport contaminants into the District's deep, water supply aquifers.

Some estimates indicate that there may be as many as 10,000 abandoned water supply wells within the boundaries of the Santa Clara Subbasin. Since there are no official records for these wells, the District has no knowledge of their existence or their locations.

In the mid-1980s, the District took a proactive stance on active and abandoned water supply wells found within known contamination plumes. At that time, with assistance from the Regional Board, the District actively searched for and destroyed known active wells and abandoned wells.

However, when abandoned water wells were discovered in areas not threatened by known groundwater contamination, they were not included in the District's well destruction efforts, but instead were treated as well violations under the Well Ordinance Program. As well violations, the District proceeded with enforcement action to force the property owner to properly destroy the well.

Unfortunately, this enforcement action often took months to complete. Property owners often didn't have the $3,000 to $15,000 dollars needed to destroy the well and had to secure loans to complete the destruction. Many property owners had negative feelings about the District after the enforcement action, especially considering that most property owners had no previous knowledge of the well and when they had discovered the well, they had been the first to inform the District of its existence.

District staff believed that while a well was found on an owner's property (and according to the Well Ordinance, that the property owner is responsible for destroying it), the owner wasn't actually responsible for the well's current status (abandoned and buried) and because the destruction of the well was in the best interest of the District, that the District should destroy it.

Therefore, in 1994, the District initiated the Abandoned Well Destruction Assistance Program to aid property owners who happen to discover an abandoned water supply well on their property. Under the Abandoned Well Destruction Program, the District destroys abandoned water wells if: 1) the property owner had no previous knowledge of the well, 2) the well was not registered with the District, 3) the well has no surface features that would have obviously indicated its presence, and, 4) the property owner enters into a Right of Entry Agreement with the District.

Current Status

Since the program's inception in 1994, the District has destroyed 108 abandoned wells under the Abandoned Well Destruction Program. Most of these wells were first discovered and reported to the District because they were flowing under artesian pressure.

Future Direction
Staff will continue to implement the program. Annually, staff receives reports of approximately 20 wells that meet program criteria and staff expect that this trend to continue.

WELLHEAD PROTECTION

Program Objective
The Wellhead Protection Program (WHP) represents the groundwater portion of the District's Source Water Assessment Program. The objective of the Wellhead Protection Program is to identify areas of the groundwater basin that are particularly vulnerable to contamination. The District uses this knowledge to focus groundwater protection, monitoring, and cleanup efforts.

Background
Groundwater vulnerability is based on groundwater sensitivity to contamination and the presence of potentially contaminating activities. Groundwater sensitivity is evaluated based on hydrogeology and groundwater use patterns. Areas with shallow groundwater, high recharge, high conductivity aquifers, permeable soils and subsurface materials, mild slopes, and high groundwater pumping rates are most sensitive to contamination. The District compiles data on hydrogeologic conditions, pumping patterns, and contamination sources, and uses GIS technology to identify areas of the groundwater basin that are particularly vulnerable to contamination.

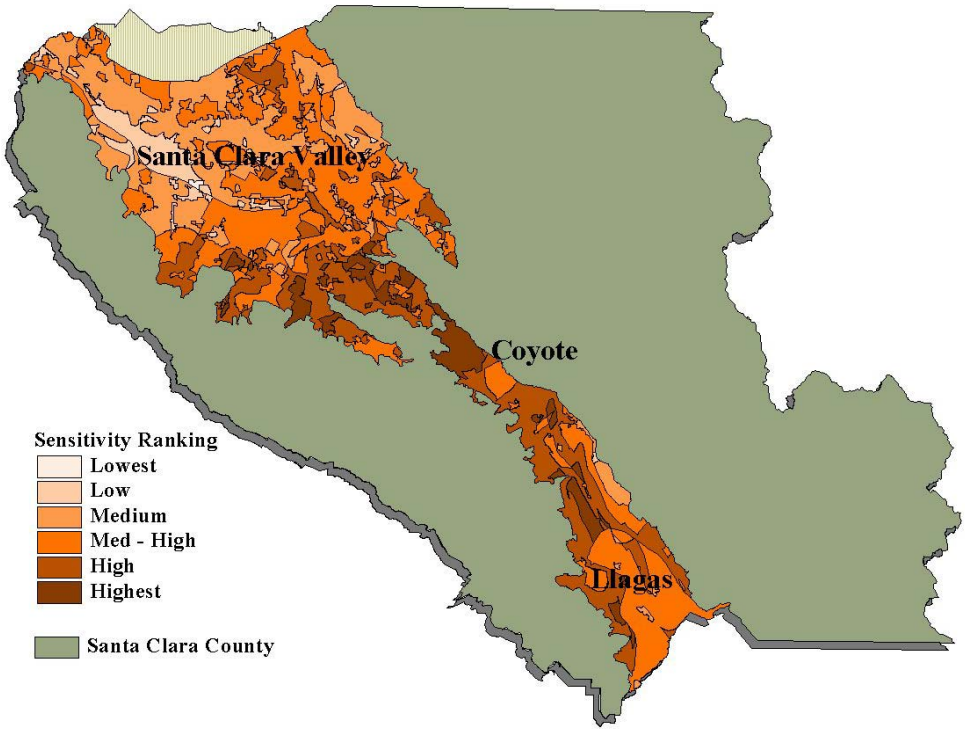
The District first began compiling groundwater protection data in the late 1980's. In 1989, the District, in collaboration with the U.S. Environmental Protection Agency (EPA), conducted a pilot project in the Campbell area to evaluate the usefulness of GIS for groundwater protection. Data on roads, city boundaries, hazardous material storage sites, groundwater recharge facilities, wells and hydrogeology were collected and used to create GIS coverages for the Campbell study area. The project team used GIS to evaluate groundwater sensitivity and draw areas to be protected around production wells. The study concluded that GIS is a feasible tool to use for WHP programs.

After the Campbell pilot study, the District expanded its groundwater protection data collection effort to encompass the entire County. Staff developed Countywide GIS coverages of active wells, abandoned and destroyed wells, geology, soil types, depth to groundwater, leaking underground storage tank sites, and petroleum storage facilities. This data, along with water quality data, is used to identify and evaluate threats to groundwater quality.

Current Status
The District created a groundwater sensitivity map to evaluate land use development proposals and make recommendations for appropriate groundwater protection strategies. In 1996, the District built upon the pilot GIS project to assess groundwater sensitivity throughout the groundwater basin using EPA's DRASTIC method. DRASTIC stands for

depth to water table, net recharge, aquifer media, soil media, topography, impact of the vadose zone, and hydraulic conductivity of the aquifer. The DRASTIC method is a quantitative evaluation of these hydrogeologic factors to assess relative groundwater sensitivity. The results of this effort were several GIS coverages and a groundwater sensitivity map (Figure 5-6), which the District uses to review land development proposals. In sensitive groundwater areas, the District requests that planning agencies require, and that property owners implement, best management practices and other protection activities beyond those required by minimum standards.

Figure 5-6
Groundwater Sensitivity Map



Staff uses information on land use and the location of contaminated sites to help identify and evaluate the sources of contamination that are detected in wells. Although groundwater quality is generally good throughout the basin, contamination is occasionally detected in individual wells. By quickly locating contamination sources, we can work with the regulatory agencies to ensure prompt and adequate cleanup.

The District also uses information on well construction, well location, well pumping, leaking Underground Storage Tank (UST) site locations and conditions, land use, and hydrogeology to prioritize leaking UST sites and identify vulnerable water supply wells. Sites that pose the greatest threat to groundwater supplies are the first to receive detailed regulatory oversight. Staff also uses this information to select wells for groundwater monitoring and special studies.

District staff is working with local water retailers on the state's Drinking Water Source Assessment and Protection (DWSAP) Program. The state's DWSAP Program is required by the 1996 reauthorization of the federal Safe Drinking Water Act. California has until May 2003 to assess all of its drinking water sources for vulnerability to contamination. The District developed a GIS-based wellhead assessment and protection area delineation tool, which delineates protection areas according to state guidelines. Once the vulnerability assessments are completed in Santa Clara County, the District will work with the water retailers to ensure that the greatest threats to their drinking water supply wells are being addressed.

Future Direction

District staff continues to create GIS coverages that help assess groundwater vulnerability. Some coverages that are in development include solvent contamination sites and plumes, dry cleaners, hazardous materials storage facilities, septic system locations, and sewer lines. The District has found great utility in these GIS coverages, and is beginning to work with other agencies and organizations to determine how we can share GIS information and increase its use for groundwater protection. We will continue to use this information to identify areas vulnerable to groundwater contamination, and focus our monitoring, protection, and cleanup efforts.

LEAKING UNDERGROUND STORAGE TANK OVERSIGHT

Program Objective

The objective of the Leaking Underground Storage Tank Oversight Program (LUSTOP) is to protect the groundwater basin from water quality degradation as a result of releases of contaminants from underground storage tanks. The District provides regulatory oversight of the investigation and cleanup of fuel releases from USTs for most of Santa Clara County.

Background

In 1983, the State Legislature enacted the UST Law [Chapter 6.7 of the Health and Safety Code] authorizing local agencies to regulate the design, construction, monitoring, repair, leak reporting and response, and closure of USTs. In the early 1980s, several drinking water wells in the County were shut down as a result of contamination by chlorinated solvents. In 1986, the Board decided to implement a leaking UST oversight program for petroleum fuels in coordination with the San Francisco Bay Regional Water Quality Control Board (RWQCB). The District Board recognized that releases from USTs affect groundwater quality and that effective protection of the County's groundwater basin demanded a proactive approach. They committed financial and technical resources in-house to quickly initiate the program.

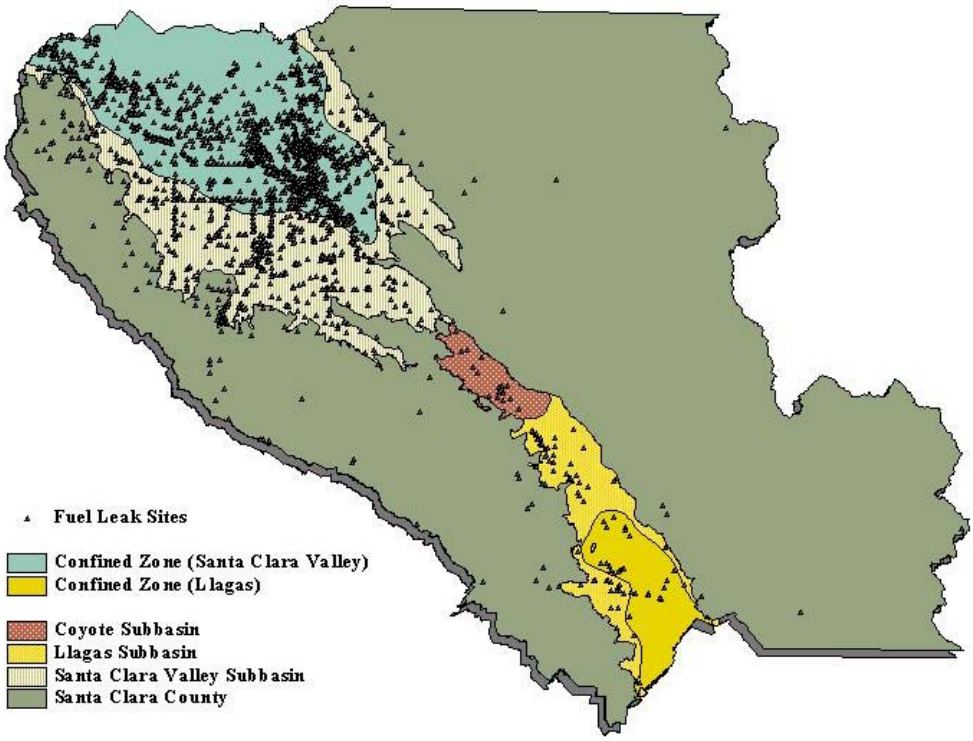
In 1987, the District entered into an informal agreement with the San Francisco RWQCB to create a pilot oversight program. At that time more than 1,000 fuel leaks had been reported within the County. The District developed an in-house technical group of employees capable of providing regulatory oversight of the investigation and cleanup of

releases from USTs. In 1988, the District and the County of Santa Clara entered into a contract with the State Water Resources Control Board to implement one of the State's first Local Oversight Programs. This allowed the District to get reimbursed by state and federal funds for costs associated with operation of the program.

The State Water Resources Control Board (SWRCB) amends its Local Oversight Program contract with the District and the County annually. Over the years, many changes have occurred in the UST regulatory process as new laws were passed, scientific knowledge improved, and new investigation and cleanup strategies became available. The District's program actively participates in ensuring that new laws and regulations continue to protect groundwater quality into the future. The District has been at the forefront of several initiatives for improving the effectiveness and efficiency of our regulatory oversight efforts and the cost-effectiveness of corrective action while protecting human health, safety, the environment and water resources.

Every leaking petroleum UST case is currently assigned to a District caseworker who provides technical and regulatory guidance to responsible parties and their consultants (Figure 5-7).

Figure 5-7
Fuel Leak Cases in Santa Clara County



The District only provides regulatory oversight on investigation and cleanup at UST sites where a release has occurred. Tank removals, leak prevention, and UST release detection activities are overseen by one of 10 other agencies, usually the local fire department. Each agency has jurisdiction over a designated geographical area in the County. If there is evidence of a leak or if contamination is detected, an agency inspector or UST owner/operator notifies the District and/or the Regional Board. The District reviews the data to confirm the release, lists the site on the Leaking Underground Storage Tank Oversight Program database, and notifies the responsible party and the SWRCB. The District then determines if the unauthorized release poses a threat to human health and safety, the environment, or water resources and, if necessary, a caseworker requests additional investigation and cleanup.

To get case closure for the release, the responsible party must provide evidence that the release does not pose a significant threat to human health and safety, the environment or water resources; or, that the release has been adequately investigated and cleaned up. Fuel leak investigation and cleanup is closely monitored by a caseworker, and the case is promptly closed when the unauthorized release no longer poses a threat to human health, safety, the environment or water resources.

Current Status

As of January 2000, a total of 2,315 fuel leak cases have been reported in the County, the majority of which have affected groundwater. Approximately 1,650 (71 percent) of reported leak cases have been closed. About 575 cases are currently within the District's UST program, while about 75 cases receive Regional Board oversight. As a local oversight program, the District has made significant progress in closing low-risk sites and sites that have performed appropriate corrective action to reduce contamination to below levels of regulatory concern.

The presence of Methyl tert-Butyl Ether (MTBE) in gasoline has precipitated additional changes in the UST regulatory process and the manner in which sites are investigated and cleaned up. Since 1995, MTBE and other oxygenates have emerged as significant contaminants at fuel leak sites within the County, causing increased concern for the protection of groundwater resources. MTBE has been blended into gasoline in high percentages (up to 15 percent by volume) beginning in the winter of 1992 with the intent to significantly improve air quality. However, MTBE is a recalcitrant chemical in groundwater, as it does not undergo significant breakdown (bio-degradation) in groundwater. As a result, MTBE contamination can migrate considerable distances in groundwater and may impact wells miles downgradient. MTBE has been detected at more than 375 current fuel leak cases in the County, with concentrations at these sites ranging from 5 parts per billion to more than 1 million parts per billion. The District has taken a progressive and vigilant approach to protecting groundwater resources from MTBE contamination through the use of GIS to manage and analyze both UST site and regional information and in demanding a more intense and detailed level of work be performed at MTBE release sites.

The District is also very concerned regarding the increasing occurrence of MTBE at operating gasoline stations, which poses a significant threat to municipal drinking water wells within the County. In response to this threat, the District completed two studies of operating gasoline stations that were in compliance with the 1998 UST upgrade requirements. The first study, completed by Levine-Fricke in 1999, involved soil and groundwater sampling at 28 facilities to determine if releases were occurring from upgraded UST systems. MTBE was detected in groundwater at 13 of the 27 sites where groundwater was encountered. The second study, completed in 2000 (SCVWD, 2000), was a case study of 16 sites with operating USTs and high levels of MTBE in groundwater to evaluate whether undetected releases are occurring and to assess weaknesses in fuel storage, management, and delivery operation. Of the 16 sites studied, undetected releases were suspected at 13 sites.

Despite the fact that gasoline stations have been upgraded to meet stringent requirements, it is clear that faulty installations, poor maintenance and poor facility operation practices are resulting in leaks, and that improvements in the management of USTs are needed to prevent widespread contamination of groundwater.

Future Direction

The District continues to provide technical guidance and regulatory oversight to cases using improved scientific knowledge and latest investigation and cleanup strategies. The District will continue to work closely with local universities, research organizations, the water community, major oil companies, local, state and federal agencies, and the state and federal legislature to ensure that problems in the UST program are identified and that prompt effective solutions are implemented to protect groundwater quality.

An effective UST leak prevention and monitoring program is essential. There are several studies underway regarding the effectiveness of leak prevention and monitoring systems at sites. The District will continue to monitor all developments in this area and propose ongoing studies and/or regulatory changes. To ensure water resources are protected, the District actively participates in the legislative process to ensure that recalcitrant chemicals like MTBE that can cause significant groundwater degradation are not used in fuels.

One of the biggest concerns for the District regarding MTBE is the significance of both short-term and long-term threats to groundwater quality. The District is committing additional resources to gain a more extensive understanding of the groundwater basin, groundwater flow patterns, and groundwater pumping trends. This improved understanding allows for better decisions regarding: the level of oversight necessary at sites; how much investigation is required to properly understand the nature and extent of contamination at sites; the level of cleanup necessary to protect groundwater resources; and the effectiveness of the program in preventing significant short-term and long-term water quality degradation.

The District will continue responding to the public regarding USTs and groundwater contamination and will ensure that files and information are available for public review.

District staff plan to have all fuel leak files scanned and electronically accessible over the Internet in the near future. Program guidance, site information, and news of the latest developments in the program are available on the District's web site.

TOXICS CLEANUP

Program Objective

The objective of the Toxics Cleanup Program is to ensure the protection of the groundwater basins from water quality degradation as a result of toxics and solvent contamination and spills of other non-fuel chemicals. The District performs peer review of these cases and makes water use and geologic information available to the public and environmental consultants. District staff also provide expert technical assistance to the regulatory agencies (County of Santa Clara, San Francisco and Central Coast Regional Boards, Department of Toxics Substances Control, and the Federal Environmental Protection Agency) responsible for the oversight of investigation and cleanup at non-fuel contaminated sites within Santa Clara County.

Background

Since the late 1970s, the District has provided expert technical and hydrogeologic assistance to agencies having the legal responsibility for the protection of the water resources serving the needs of Santa Clara County. The discovery of groundwater contamination at Fairchild Semiconductor in 1981 resulted in heightening the awareness for the protection of groundwater quality and the need for the District to be actively involved in ensuring that appropriate investigation and cleanup of sites was undertaken in a timely manner. District staff were actively involved with the review and analysis of early laws governing the regulation of underground storage tanks and hazardous materials and in laws, regulations, and policies to ensure groundwater resource protection. District staff have documented the migration of contamination down abandoned wells and conduits and fashioned a well installation and destruction ordinance to ensure that wells were properly installed and potential conduits properly destroyed.

Current Status

The District has records of over 700 releases of non-fuel related cases involving the release of solvents, metals, pesticides, Polychlorinated Biphenyls (PCBs), and a variety of other chemicals in Santa Clara County. The San Francisco Bay RWQCB provides regulatory oversight on over 600 cases in the Santa Clara Valley and Coyote Subbasins. The Central Coast RWQCB provides oversight on an estimated 35 cases in the Llagas Subbasin. The California Department of Toxics Substances Control provides oversight of 17 cases and the Federal EPA provides oversight of 11 sites.

The District maintains an elaborate filing system for these cases that is heavily used by the environmental consultants and the public researching contaminated sites. District staff actively track and peer review the most serious of these cases (primarily the Superfund sites). Staff provide review and comment on Site Cleanup Requirements and Cleanup and Abatement Orders prepared by the Regional Boards and investigation and cleanup reports prepared for these sites. The District provides geologic and technical

expertise to responsible parties (site owners and operators) and their consultants and staff, and regularly participate in various committees and public meetings to ensure groundwater protection issues are properly addressed.

Future Direction
The District plans to continue these efforts in addition to conducting a review of all the recorded cases to ensure that all have been properly addressed by the various regulatory agencies. Many cases have remained "inactive" and may not have performed appropriate investigation and cleanup. The District plans to inform the regional boards and other agencies of these reviews and assist them to ensure appropriate work is performed. The District also plans to make more information available regarding geologic conditions and the status of solvent and toxics cases in GIS and over the Internet.

LAND USE AND DEVELOPMENT REVIEW

Program Objective
The objective of the Land Use and Development Review Program is to evaluate the land use and developments occurring within the County for adverse impacts to watercourses under District jurisdiction and to other District facilities, including the pollution of groundwater.

Background
Land development decisions made by the cities and the County influence a variety of issues related to water quality and quantity. The District reviews land development proposals, identifies any potential adverse impacts to District facilities and provides comments to the lead agency charged with making the final decision for the proposals. The District also reviews Draft Environmental Impact Reports (DEIRs) and/or EIRs and provides comments to the lead agency.

Current Status
The District reviews and comments on proposed land development, environmental documents and city and County General plans. Review of land development proposals includes a determination of direct and indirect impacts to District facilities. Indirect impacts could result from increased runoff and flooding due to new impervious surface or introduction of pollutants to a watercourse from construction activities or urban runoff. Direct impacts to watercourses under District jurisdiction are addressed through the District's permitting program as defined by Ordinance 83-2.

This ordinance allows the District to investigate whether a proposed project or activity will:

a. Impede, restrict, retard, pollute or change the direction of the flow of water.

b. Catch or collect debris carried by such water.

c. Be located where natural flow of the storm and flood waters will damage or carry any structure or any part thereof downstream.

d. Damage, weaken, erode, or reduce the effectiveness of the banks to withhold storm and flood waters.

e. Resist erosion and siltation and prevent entry of pollutants and contaminants into water supply.

f. Interfere with maintenance responsibility or with structures placed or erected for flood protection, water conservation, or distribution.

If a project appears likely to do any of the above, the District may deny or conditionally approve the permit application for the proposed project.

Future Direction

The California Environmental Quality Act (CEQA) provides the District an opportunity to comment in areas relevant to the issues listed above; however, cities need to make certain these issues are adequately addressed and treated. The use of Ordinance 83-2 and CEQA have generally not effected adequate attention to these issues.

In years past the District has relied on local agencies to place conditions on development projects and to include provisions that address District water supply and flood protection measures. The recent increase in development and land use coupled with more stringent environmental concerns and requirements imposed by other regulatory agencies has made it necessary for the District to shift to a more proactive approach and to undertake greater participation in development planning activities. District land use and development review staff plan to participate on interagency project teams, conduct general plan review and revision, and development of relevant policies (such as riparian corridor and building setback policies). The program will also seek revisions to Ordinance 83-2, and greater education of land development planning staff and officials.

Additional Groundwater Quality Management Activities

Groundwater Guardian Affiliate

The District was designated as Groundwater Guardian Affiliate for the year 2000. Groundwater Guardian is an annually earned designation for communities and affiliates that take voluntary, proactive steps toward groundwater protection. The district earned the designation in 2000 based on activities such as conducting irrigation, nutrient, and pesticides management seminars, sponsoring a mobile irrigation management laboratory, and creating a prototype zone of contribution delineation tool for delineating wellhead protection areas. The Groundwater Guardian Program is sponsored by The Groundwater Foundation, a private, international, not-for-profit education organization that educates and motivates people to care about and for groundwater. The District will continue to participate in the program by submitting annual work plans and reports documenting our groundwater protection efforts.

Comprehensive Reservoir Watershed Management

The District has initiated a Comprehensive Reservoir Watershed Management Project to protect the water quality and supply reliability of the District's reservoirs. The District seeks to balance watershed uses, such as the rights of private property owners and public recreational activities, with the protection and management of natural resources. The District recognizes that preserving beneficial watershed uses can benefit reservoir water quality, which in turn benefits drinking water quality delivered to the District treatment plants and recharged into the groundwater basins.

Watershed Management Initiative

The District is an active participant in the San Francisco Bay Regional Water Quality Control Board's Santa Clara Basin Watershed Management Initiative (WMI). The purpose of the WMI is to develop and implement a comprehensive watershed management program. The goals of the WMI include balancing the objectives of water supply management, habitat protection, flood management, and land use to protect and enhance water quality, including the quality of water used for groundwater recharge and water in the groundwater basins. The WMI will develop a watershed management plan that will set out agreed upon actions to meet stakeholder goals, including water quality protection and enhancement.

Non-Point Source Pollution Control

The District along with other agencies is the co-permittee for National Pollution Discharge Elimination System (NPDES) permit number CAS029718. The co-permittees formed the Santa Clara Valley Urban Runoff Management Program in 1990 to develop and implement efficient and uniform approaches to control non-point source pollution in storm water runoff that flows to the South San Francisco Bay, in compliance with NPDES permit responsibilities.

Chapter 6
SUMMARY

The many groundwater management programs and activities described in this document demonstrate that the District is proactive and effective in terms of ensuring that groundwater resources are sustained and protected. A summary of existing District groundwater programs is presented here, organized by report section.

Groundwater Supply Management

The objective of the District's groundwater supply management programs is to sustain groundwater resources by replenishing the groundwater basin, increasing basin supplies, and mitigating groundwater overdraft. This is currently achieved through:

- In-stream recharge, including controlled and uncontrolled recharge through District facilities.
- Off-stream recharge through District percolation ponds and abandoned gravel pits, including activities to reduce turbidity of incoming water.
- Periodic water balance to reconcile water imports, inflows, releases, and changes in surface water storage.
- Direct injection recharge facilities.
- Water use efficiency programs.
- Estimation of operational storage capacity.
- Subsidence and groundwater flow modeling to evaluate potential impacts to the groundwater basin.
- Public outreach and education for water use efficiency programs.

Groundwater Monitoring

The District's groundwater monitoring programs provide basic data to assist in the evaluation of groundwater conditions. Programs include:

- Groundwater quality monitoring, including sampling for general minerals, trace metals, and physical characteristics.
- Groundwater elevation monitoring, including depth-to-water measurements and the development of groundwater contour maps.
- Groundwater extraction monitoring, which tracks groundwater use throughout the County.

- Land subsidence monitoring, which measures existing subsidence.

Groundwater Quality Management
Existing programs designed to protect the groundwater from contamination and the threat of contamination include the following:

- Nitrate management program designed to delineate, track, and manage nitrate contamination by monitoring nitrate occurrence, and by reducing further loading and the public's exposure to nitrate.

- Saltwater intrusion prevention program to prevent freshwater aquifers from degradation through monitoring and the sealing of contaminant conduit wells.

- Well construction and destruction programs to protect groundwater resources by ensuring that wells will not allow the vertical transport of contaminants.

- Wellhead protection program to identify areas of the basin that are particularly vulnerable to contamination to focus groundwater protection, monitoring, and cleanup efforts.

- Leaking underground storage tank oversight program to protect the groundwater from water quality degradation and provide regulatory oversight of investigation and cleanup of fuel releases from underground tanks.

- Toxics cleanup program to protect the basin from contamination by non-fuel chemicals.

- Land use and development review to evaluate land use proposals in terms of potential adverse impacts to District facilities.

- Public outreach and education for groundwater quality management programs.

Recommendations
In 1999, the District Board of Directors established Ends Policies that direct the Chief Executive Officer/General Manager to achieve specific results or benefits. The following Ends Policies are related to groundwater:

E.1.1.2. The water supply is reliable to meet current demands.
E.1.1.3. The water supply is reliable to meet future demands as identified in the District's Integrated Water Resource Plan (IWRP) process.
E.1.1.4. There are a variety of water supply sources.
E.1.1.5. The groundwater basins are aggressively protected from contamination and the threat of contamination.
E.1.1.6. Water recycling is expanded consistent with the District's Integrated Water Resource Plan (IWRP) within Santa Clara County.
E.1.2.2.3. Groundwater supplies are sustained.

Two of the Ends Policies directly relate to the management of groundwater resources: 1.1.5 - The groundwater basins are aggressively protected from contamination and the threat of contamination, and 1.2.2.3 - Groundwater supplies are sustained. As the District is now formally guided by these policies, we need to ensure that program outcomes match these ends.

Although the District manages the basin effectively, there is room for improvement of the groundwater programs in terms of meeting the Ends Policies and in the coordination and integration of the programs. Specific areas where further analysis is recommended include:

1. **Coordination between the Groundwater Management Plan and the Integrated Water Resources Plan (IWRP) –** As the District's water supply planning document through 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

2. **Integration of groundwater management programs and activities** – Individual groundwater management programs tend to be implemented almost independently of other programs. A more integrated approach to the management of these programs, and to the management of the basin overall needs to be developed. Integration of these programs and improved conjunctive use strategies will result in more effective basin management.

3. **Optimization of recharge operations** – As artificial recharge is critical to sustaining groundwater resources, an analysis of the most effective amount, location, and timing of recharge should be conducted.

4. **Improved understanding of the groundwater basin** – In general, the existing groundwater management programs seem to focus on managing the basin to meet demands and protecting the basin from contamination and the threat of contamination. However, improving the District's understanding of the complexity of the groundwater basin is critical to improved groundwater management. The more we know about the basin, the better we can analyze the impact of different groundwater scenarios and management alternatives.

5. **Effective coordination and communication with internal and external agencies** – Improved communication and coordination will lead to improved groundwater management programs. Increased sharing of ideas, knowledge, and technical expertise among people involved with groundwater at the District will result in increased knowledge, well-coordinated and efficient work, and well-informed analyses and conclusions. Improved coordination with external agencies, such as retailers and state and federal organizations, will result in improved knowledge of customer needs and increased awareness of District activities.

A detailed analysis of the areas above and of all groundwater programs as they relate to Ends Policies and the groundwater management goal is recommended.

The next update of the Groundwater Management Plan, scheduled for 2002, will address the issues above and the overall management of the basin by presenting a formal groundwater management strategy for achieving the groundwater management goal in a practical, cost-effective, and environmentally-sensitive manner. The update will evaluate each groundwater program's contribution and effectiveness in terms of the groundwater management goal and Ends Policies. Measurement criteria will be developed, and if there is no direct connection between the Ends Policies and a specific program, that program's contribution to other linked programs will be analyzed. The update will include recommendations for changes to existing programs or for the development of new programs, standards, or ordinances. The update will also develop an integrated approach for the management of groundwater programs, and for the management of the groundwater basin in general.

Groundwater is critical to the water supply needs of Santa Clara County. Therefore, it is of the utmost importance that the District continues the progress begun with this Groundwater Management Plan. Increased demands and the possibility of reduced imported water in the future make effective and efficient management of the groundwater basin essential. The Groundwater Management Plan and future updates will identify how the management of the groundwater basin can be improved, thereby ensuring that groundwater resources will continue to be sustained and protected.

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Appendix E

Demand Forecast Methodology

Appendix E Demand Forecast Methodology

UWMP 2005 Demand Projection

As part of the UWMP 2005 the District updated the water demand forecast from the IWRP 2003 Planning Study. The intent of these forecasts is to identify emerging trends in water use to determine if the projected water demands compare to demands used in the District's planned long term water supply program. The updated water demand projection for the county is based on the most current demographic projections available by census tract at the time the analysis was performed (Association of Bay Area Governments [ABAG] Projections 2005).

The exception to this is the demand projections for the specific common SFPUC customers that are based upon the 2003 SFPUC Demand Study Report. In that study, ABAG 2002 projections were used for the end use model developed for the SFPUC by URS Corporation. In order to ensure consistency with the District's overall demand projections, the SFPUC projections for the common SFPUC customers were compared to the District projections using ABAG Projections 2005. The District demand projection for the common SFPUC customers was within an acceptable tolerance of 1 percent of the SFPUC projections.

In addition, the District compared its projections to the most recent projections from the water retailers and found that countywide, the retailer demand projections and District projections for the retailers as a whole, less than 0.1 percent agreement. However, in South County (Llagas/Coyote basin), the retailer demands were higher than District demands. Since the retailer projections of population increases were above ABAG projections, but were part of the general plans, the District incorporated those demands into the county demand model. The increased demand was less 2 percent of the total county demand at 2030.

District Water Demand Projection Methodology

The District chose to use regional growth projections prepared by the ABAG to predict future water demand. Land-use considerations are used by ABAG to develop their demographic projections and thus, land-use considerations are factored into the District's water demand projections. Land-use methods are commonly used by city and county planning departments since water use impacts from general plans and zoning changes can be more easily quantified. Such methods are more difficult for wholesale water agencies like the District, since over a dozen general plans are within the District's service area and water use data by land-use-zoning type for Santa Clara County is not readily accessible.

The District's water demand projections used the IWRMAIN (Institute for Water Resources -- Municipal And Industrial Needs) Water Demand Management Suite© forecasting model, a tool developed in the 1980s under the direction of the U.S. Army Corps of Engineers Institute of Water Resources to improve water use forecasting within the Corps. In addition to the Corps, IWRMAIN has been applied to major water utilities throughout the United States, including many in the West such as the City of San Diego Water Utilities Department and the Metropolitan Water District of Southern California. The latest version of the software model, Version 6.1, was utilized for this demand projection. Input data included regional growth projections (ABAG 2005) which were allocated to the water retailers' customer classes. Other data was obtained from the U.S. Census Bureau, California Department of Finance, water master plans, urban water management plans, general plans and discussions with water retail agencies and city planning staff.

IWR-MAIN Water Demand Management Suite© uses base year water use and demographic, housing, and business statistics to estimate existing water demands together with the official projections (provided by regional planning agencies like ABAG) of population, housing, and employment to derive projections of water use in future years. For this demand update, the "build forecast models" was employed for each Water Service Area (WSA), so that the independent data from the retailers is tailored to their customer classes and data sets.

The data required by the model is more readily available than GIS-based models, relying on socio-economic data generally available from the U.S. Census Bureau and demographic projections available from ABAG. In developing their demographic projections, ABAG looks carefully at local governments' plans and policies while factoring in the regional economic and demographic conditions, giving a more balanced view of the future of the region than can be achieved from analyzing general plans alone.

Water Demand Model

As a wholesaler, the District does not have detailed billing/sales data by customer class. In an effort to project demand by customer class (i.e., residential, business, irrigation), monthly/bimonthly billing data was obtained from the water retailers for years 2000 to 2003. Each water agency has different billing categories which makes countywide sector use difficult to project to a fine level of detail. However, the data from most agencies was sufficient to at least differentiate between residential and non-residential water use. The 2000 water sales data was used as the base year, which coincides with a census year and near average weather.

The countywide demand was calculated, as was the demand for distinct geographic and hydrologic areas. The District's demand projection approach, based on the IWRMAIN demand forecasting modules, disaggregates total urban water use into spatial and temporal components (spatially by District WSA; temporally by monthly variation, and sectorally by the variations of water use among the various customer classes and sectors).

Projecting water use by WSA helps in groundwater basin management and facilities planning. In addition, since each WSA has a different demographic makeup and different growth rates, spatially disaggregating the water use projection forecasts by WSA gives a more accurate total water demand projection result.

The water demand is further categorized by the customer sectors that are using the water: residential, non-residential, public, other and unaccounted-for uses. Residential water use is that used in a household environment, either indoors for toilet flushing, cooking, or washing, or outdoors for landscape watering. Non-residential water use is that associated with commercial, industrial, school and government uses. In the District's modeling, public water use is water used for public large landscapes. Unaccounted-for water use includes un-metered uses, such as fire hydrants, distribution system maintenance, and system losses.

The water demands for each sector in a given WSA are expressed as a product of (1) the number of users (i.e., demand drivers such as the number of housing units, employees, etc.) and (2) the water use per unit (e.g., per household or per employee) as derived from the 2000 base year water use by sector and housing and employment demographics. Other demand driver variables employed in the model include climate (average monthly precipitation and high temperature), household size and household income.

Data Collection

- *Water Sales Data*
  The majority of municipal and industrial water supplied in the county is delivered by private or municipal water retailers. The District requested monthly water sales data from each retailer for the years 2000 to 2003.

  District sales data was also obtained where the District provides water directly to the user (such as small water companies, private wells, surface water sales, agricultural use).

  For the SFPUC common customers, data was also obtained from the SFPUC "Wholesale Customer Water Demand Projections" (URS, 2004) report and Bay Area Water Supply and Conservation Agency (BAWSCA) staff.

- *Climate Data*
  Monthly rainfall and average maximum temperature data was collected from NOAA National Data Centers for years 2000 through 2004 for four local weather stations. Historical average climate data was collected from NCDC/WRCC (National Climate Data Center/Western Regional Climate Center). Evapotranspiration (ETo) was obtained from the California Irrigation Management Information System (CIMIS).

- *Demographic Data*
  2000 population and demographic data was obtained from the U.S. Census Bureau by requesting and purchasing custom tabulation produced by the Housing and Household Economic Statistics Division, U.S. Census Bureau, using data from the 2000 Census of Population and Housing. The data included housing statistics by housing type (single family, multi-family), family size and family income by census tract.

  Housing and employment projections were obtained from the ABAG Projections 2005. Both city tables and data by census tract were utilized.

  Short term housing growth and projections were obtained through local general plans/housing elements and by meeting with local planning agencies.

Water Use Data Analysis

Most retailers have billing categories of residential and non-residential. Most have subcategories for residential which differentiate from single family and multi-family. This is important as the water use differs significantly between the two groups (i.e., multi-family [MF] has fewer persons per household and less outdoor water use than single family [SF]). Also, most retailers have non-residential sectors with varying water use (i.e, commercial vs. industrial vs. irrigation). This allowed for allocating ABAG and General Plan growth projections to the specific billing categories. There were some difficulties in aligning the non-residential sub-sectors from projections to billing categories due the varying way retailers categorize these sectors. Therefore, District staff met with most retailers and planning staff to make agreed upon allocations of job sectors to billing categories.

For each retailer data set, the monthly billing data for 2000 to 2003 was evaluated for trends and outliers. Any data outside of the norm or with abnormal or unexpected trends was discussed with the retailers for a better understanding of what the data represented and how

certain billing categories may have individual characteristics to take into account. In only a few cases were there outliers that resulted in data smoothing, performed with the concurrence of the retail agency.

Model Data Input

2000 water sales data was used as the base year water use for model input. Then, the 2000 Census data, ABAG 2005 data and General Plans were consulted to allocate the base year counting units (i.e. number of SF, MF, Jobs/Sector, Accounts, as appropriate). In addition, monthly climate data for 2000 was used.

For growth projections, planning staff gave information on short term residential growth (to 2003 or to 2005) and long term projections based on approved General Plans or Housing Elements. An attempt was made based on this information to input real housing growth by sub-sector for the year 2003 or to 2005. Non-residential growth for 2003 was based on interpolation of ABAG 2005 data for the projections of years 2000 and 2005. Actual climate data for 2003 was also input into the model.

Model Validation

The model was then run to compare the 2003 model projection to actual 2003 water sales by service area. This is important to ensure the model is realistic. This also allows for adjusting elasticities of certain model variables by sub-sectors. An example is that different sub-sectors water use reacts differently to changes in climate for example single family residential water use is highly climate dependent, whereas most industrial uses may not be. The reactions to changes in model variables also changes by retail agency due to variability in the way a business is categorized for example some retailers' Industrial categories had little reaction to climate, while others may have included industrial park irrigation and reacted more to climate changes. Therefore, each sector was evaluated independently to changes in model variables. Graphs of yearly data were evaluated to detect the reactions to climatic change. The elasticities in the model were then adjusted on a case by case basis where appropriate. Then the 2003 model results and 2003 actual water use were again compared. In some instances it was necessary to readjust elasticities. In most cases the residential sector model results were within less than 1percent to less than 5 percent of actual water use. However, the non-residential results for many of the sub-sectors were not as good of a match. This is because of the difficulty of assigning job categories from ABAB 2005 to billing categories and due to inherent difficulty in projecting job growth in 2003 at the local level. However, in most cases, the total 2003 model projection and total retail water sales were within 5 percent. In these cases, it was determined that the model was reasonable in its projections.

For future years' growth projections, ABAG 2005 city tables were used for retail agencies for which the service area was the same as the city boundary. ABAG residential growth was also compared to General Plans or Housing Elements (GP/HE) to differentiate between single family and multi-family housing. Also the GP/HE and discussions with planning staff were used to determine future growth in each category. Most cities in northern Santa Clara County are essentially built out and single family growth in future years will be minimal to non-existent. Most planning departments are looking toward reuse of underutilized parcels to increase housing unit stock, mostly multi-residential. In cases where the retailer and city boundaries were different, ABAG 2005 Projections by Census Tract was used to create estimated growth.

Non-job-related water use categories were evaluated on a case by case basis with coordination of the retail agencies. These sectors include, in some cases, irrigation and recycled water. Large turf irrigation is not job dependent. Recycled water, for the most part, was divided among irrigation and industrial use. Each retail agency was consulted on projected growth in these sectors. For instance, one retail agency was adding 1.4 MGD for use in a new power plant. No growth was expected for that category. In these cases, the demand was flat lined through 2030. Unaccounted for water estimates were obtained from the retail agency, water master plans and urban water management plans.

Non-Retailer Demand

The balance of county water demand is based on District direct water sales to non-retail customers. There are thousands of independent groundwater well users in the county. Uses of the groundwater can include domestic, irrigation, and mutual water companies, industrial/manufacturing and environmental cleanup. The independent groundwater pumping data for 2000 was allocated to each WSA. No growth was applied to the 2000 independent groundwater demand for several reasons:

- The District does not have detailed billing categories for independent pumping. Often it is impossible to differentiate between domestic and irrigation or between industrial and environmental cleanup. Therefore, it was not useful to apply residential and non-residential growth projections.

- Domestic use of independent pumping is not expected to increase in the North County. Most users have access to municipal supplies and many unincorporated areas are expected to be annexed by the municipality in the future. Therefore, growth in domestic independent use is not expected and any domestic water demand increases are expected to be captured in the retailer service area demands.

- Industrial/Manufacturing independent groundwater pumping is not expected to increase. As discussed in Chapter 3 of the 2005 UWMP, manufacturing and industrial sectors have seen a significant economic decline and movement out the county. Projections show little to slow growth in the future, and these sectors are unlikely to ever return to historic highs.

- Environmental cleanup is also not expected to grow in water usage. Many contaminated sites are nearing their cleanup life. In addition, alternative cleanup strategies are replacing the formerly traditional “pump and treat” methods.

Conclusion

The District’s demand projections were conducted in accordance with standard industry practices and the UWMP Act Requirements; specifically that population trends “…are based upon data from the state, regional, or local service agency…” and that the District, as an urban water supplier indirectly providing water, coordinated with local water suppliers. In addition, the model was verified two ways; 1) by comparing 2003 projected water use to 2003 water use by service area, and 2) by comparing District demands with retailer demands to 2030. The District’s 2030 demand result for the combined retail agencies was within 0.1percent of the demand results provided by the retail agencies. Lastly, the countywide demand result is within the demand projection for 2030 identified in the District’s Draft 2003 Integrated Water Resources Planning Study Report.

Appendix F

Demand Management Measures

Appendix F

Figure F-1 Urban Water Conservation Demand Management Measures Summary

DMM No.	Program Name	Coverage Requirements	Countywide Implementation Requirements by 2008	Implemented By
1 * *** ****	Water Survey Program	Not less than 15% of SF residential accounts to receive water use surveys within 10 years of the implementation date. Not less than 15% of MF units to receive water use surveys within 10 years of the implementation date.	Complete surveys for 53,000 - SF units and 29,000 - MF units by 2008 from census data. (SF total in 1998 was 355,000 and MF total in 1998 was 195,000.)	District in cooperation with retailers. SJ Water Company has separate program.
2 * ***	Plumbing Retrofit	Distribution and installation program covering 10% of SFD and MFD each reporting period. The program must continue until we can demonstrate that 75% of SFD and MFD have been retrofitted.	Approximately 583,000 SF and 175,000 showerheads retrofitted. From CA Dept of Finance - 353,000 pre 1992 SF Homes and 194,000 pre 1992 MF units (from District's BMP 1 program, assumes 2.2 and 1.2 showerheads per household in SF and MF, respectively).	District in cooperation with retailers.
3	Water System Audits	Maintain an active auditing program of the distribution system. Identified leaks must be repaired when cost-effective.	Maintain active distribution system auditing program.	District maintains for main pipelines Retailers maintain for their area systems.
4	Metering w/Commodity Rates	100% of existing un-metered accounts to be metered within 10 years.	100% metered.	Retailers and City governments. County 100% metered.
5 *** ****	Large Landscape Program	1) Water use budgets developed for 90% of CII accounts with dedicated landscape services by second reporting period. 2) At least 20% of CII accounts contacted each reporting period, and landscape audits offered. 3) Landscape audits completed for at least 15% of CII accounts with mixed-use meters within 10 years of implementation date.	Difficult to calculate requirement – currently do not have access to billing data. District working on a web-based budget database that will be available countywide for all large landscape sites (dedicated meters and mixed-use meters).	District implements programs for entire county in cooperation with retailers.

DMM No.	Program Name	Coverage Requirements	Countywide Implementation Requirements by 2008	Implemented By
6 * ***	Washing Machine Program	Cost-effective incentive for the purchase of high-efficiency washing machine offered if incentives are also offered by local energy service provider or waste water utility.	Continue to offer cost-effective incentives while local energy service provider or waste water utility offers an incentive.	District in cooperation with retailers.
7	Public Information Program	Maintain an active public information program to promote and educate customers about water conservation.	Maintain active program through 2008.	District maintains in cooperation with cities and retailers.
8	School Education Program	Maintain an active school education program to promote and educate students about water conservation and efficient water uses.	Maintain active program through 2008.	District maintains in cooperation with cities and retailers.
9 * ** ***	Commercial, Industrial, Institutional Program	CII ULFT program water savings equal to 3% of Total Water Savings Potential by July 1, 2004. PLUS EITHER: 1) 10% of CII customers to accept water use surveys within ten years of implementation date OR: 2) Reduce water use by CII customers by at least 10 percent from the base year 1997.	Difficult to calculate requirement – currently do not have access to billing data.	District implements programs throughout County in cooperation with retailers.
10	Wholesaler Assistance	Wholesale agency to provide either financial or technical support to retailers.	Maintain a wholesaler assistance program.	District.
11	Conservation Pricing	Maintain rate structure consistent with definition of conservation pricing.	Adopt and maintain conservation pricing	District maintains flat rate Some retailers have voluntarily adopted tiered pricing systems.
12	Conservation Coordinator	Agency shall staff and maintain the position of conservation coordinator and provide support staff as necessary.	Staff and maintain conservation coordinator Position.	District and retailers.

DMM No.	Program Name	Coverage Requirements	Countywide Implementation Requirements by 2008	Implemented By
13	Water Waste Prohibition	Adopt water waste prohibitions as previously outlined.	Adoption of measures consistent with DMM.	Retailers/Cities.
14 * ** ***	Residential ULFT Program	Water savings from ULFT replacement programs at least as effective as an ordinance requiring the replacement of high-water-using toilets with new ULFTs. Replacement program to last ten years.	Program as effective as retrofit upon resale ordinance. District has completed this DMM for the county. See Figures F7 – F9 for a detailed analysis.	District in cooperation with retailers City of San Jose for eight cities that feed the San Jose/Santa Clara Wastewater Treatment Plant.

* City of San Jose cost shares on behalf of eight cities that feed the San Jose/Santa Clara Wastewater Treatment Plant.

** City of Sunnyvale cost shared in 2002 and 2003.

*** City of Palo Alto cost shared 2002 - 2005.

**** California Water Service Company cost shared in 2004 -2005

Figure F-2 Wholesaler DMMs

DMM No.	Program Name	Coverage Requirements	Implementation Requirements by 2008
3	Water System Audits	Maintain an active auditing program of the distribution system. Identified leaks must be repaired when cost-effective.	Maintain active distribution system auditing program
7	Public Information Program	Maintain an active public information program to promote and educate customers about water conservation.	Maintain active program through 2008
8	School Education Program	Maintain an active school education program to promote and educate students about water conservation and efficient water uses.	Maintain active program through 2008
10	Wholesaler Assistance	Wholesale agency to provide either financial or technical support to retailers.	Maintain a wholesaler assistance program
11	Conservation Pricing	Maintain rate structure consistent with definition of conservation pricing.	Adopt and maintain conservation pricing
12	Conservation Coordinator	Agency shall staff and maintain the position of conservation coordinator and provide support staff as necessary.	Staff and maintain conservation coordinator position

As the water wholesaler for the county, SCVWD is responsible for implementing the DMMs listed above.

Figure F-3 Budget and Staff Time Summary for FY 01-02

DMM*	Programs	Est. Budget	Est. Staff time**
1	Residential Water Audits	$400,000	0.7 FTE
2	Residential Retrofit	$34,000	0.2 FTE
3	System Water Audit & Leak Detection	(Operations budget)	(Operations staff)
4	Metering w/ Commodity Rate	($0-Fully metered)	N/A
5	Landscape Water Audits	$156,000	0.2 FTE
6	Washing Machine Rebates	$375,000	0.6 FTE
7	Public Information	$260,000	~ 1.0 FTE
8	School Education Program	$175,000	1.0 FTE
9	CII Conservation Programs	$770,000	1.0 FTE
10	Wholesale Agency Programs	(Entire program)	N/A
11	Conservation Pricing	N/A	N/A
12	Conservation Coordinator	N/A	1.0 FTE
13	Water Waste Prohibition	N/A	N/A
14	ULFT Program	$2,000,000	1.4 FTE
	TOTAL	**~$4,270,000**	**~7 FTE**

* Some programs listed above are beyond the requirements of the DMM
** In addition to full time employees, the District also relies upon 4-6 interns to assist with programs
FTE = Full Time Employee

Figure F-4 Budget and Staff Time Summary for FY 02-03

DMM*	Programs	Est. Budget	Est. Staff time**
1	Residential Water Audits	$400,000	0.7 FTE
2	Residential Retrofit	$34,000	0.2 FTE
3	System Water Audit & Leak Detection	(Operations budget)	(Operations staff)
4	Metering w/ Commodity Rate	($0-Fully metered)	N/A
5	Landscape Water Audits	$156,000	0.2 FTE
6	Washing Machine Rebates	$375,000	0.6 FTE
7	Public Information	$180,000	~ 1.0 FTE
8	School Education Program	$175,000	1.0 FTE
9	CII Conservation Programs	$770,000	1.0 FTE
10	Wholesale Agency Programs	(Entire program)	N/A
11	Conservation Pricing	N/A	N/A
12	Conservation Coordinator	N/A	1.0 FTE
13	Water Waste Prohibition	N/A	N/A
14	ULFT Program	$2,000,000	1.4 FTE
	TOTAL	**~$4,190,000**	**~7 FTE**

* Some programs listed above are beyond the requirements of the DMM
* In addition to full time employees, the District also relies upon 4-6 interns to assist with programs
FTE = Full Time Employee

Figure F-5 Budget and Staff Time Summary for FY 03-04

DMM*	Programs	Est. Budget	Est. Staff time**
1	Residential Water Audits, Residential Weather-Based Controllers	$560,000	0.5 FTE
2	Residential Retrofit	$20,000	0.1 FTE
3	System Water Audit & Leak Detection	(Operations budget)	(Operations staff)
4	Metering w/ Commodity Rate	($0-Fully metered)	N/A
5	Landscape Water Audits/Budgets, Weather-Based Irrigation Controllers, Dedicated Landscape Meters, Landscape Rebates, Irrigation Retrofits	$900,000	1.0 FTE
6	Washing Machine Rebates	$600,000	0.5 FTE
7	Public Information	$456,000	0.5 FTE
8	School Education Program	$166,000	2.0 FTE
9	CII Conservation Programs: High Efficiency Washing Machines, High Efficiency Toilets, Pre-Rinse Spray Valves, Innovative CII Retrofits	$1,600,000	1.0 FTE
10	Wholesale Agency Programs	(Entire program)	N/A
11	Conservation Pricing	N/A	N/A
12	Conservation Coordinator	N/A	1.0 FTE
13	Water Waste Prohibition	N/A	N/A
14	High Efficiency Toilet Programs	$275,000	0.3 FTE
	TOTAL	**~$4,577,000**	**~7 FTE**

* Some programs listed are above and beyond the requirements of the DMM.
** In addition to full-time employees, the District also relies upon 4-6 interns to assist with programs.
FTE = Full Time Employee.

Figure F-6 Budget and Staff Time Summary for FY 04-05

DMM*	Programs	Est. Budget	Est. Staff time**
1	Residential Water Audits, Residential Weather-Based Controllers	$640,000	0.5 FTE
2	Residential Retrofit	$20,000	0.1 FTE
3	System Water Audit & Leak Detection	(Operations budget)	(Operations staff)
4	Metering w/ Commodity Rate	($0-Fully metered)	N/A
5	Landscape Water Audits/Budgets, Weather-Based Irrigation Controllers, Dedicated Landscape Meters, Landscape Rebates, Irrigation Retrofits	$1,000,000	1.0 FTE
6	Washing Machine Rebates	$1,000,000	0.5 FTE
7	Public Information	$448,000	0.5 FTE
8	School Education Program	$166,000	2.0 FTE
9	CII Conservation Programs: High Efficiency Washing Machines, High Efficiency Toilets, Innovative CII Retrofits, CII Surveys	$1,150,000	1.0 FTE
10	Wholesale Agency Programs	(Entire program)	N/A
11	Conservation Pricing	N/A	N/A
12	Conservation Coordinator	N/A	1.0 FTE
13	Water Waste Prohibition	N/A	N/A
14	High Efficiency Toilet Programs	$150,000	0.2 FTE
	TOTAL	**~$4,574,000**	**~7 FTE**

* Some programs listed are above and beyond the requirements of the DMM.
** In addition to full-time employees, the District also relies upon 4-6 interns to assist with programs.
FTE = Full Time Employee.

Figure F-7 Number of toilets installed prior to 1998

Agency-Assisted ULFT Replacements		
	Single Family	**Multi Family**
1993	1,244	4,762
1994	3,481	2,201
1995	7,367	2,352
1996	9,438	2,933
1997	16,290	12,081

Figure F-8 Savings (AF) through 2007 for all toilets replaced prior to 1998

	Credit For Single Family Replacements (AF)	Credit For Multi Family Replacements (AF)	Total Credit (AF)
1998	3,024 AF	3,936 AF	6,960 AF
1999	3,702 AF	4,754 AF	8,455 AF
2000	4,353 AF	5,538 AF	9,891 AF
2001	4,978 AF	6,291 AF	11,269 AF
2002	5,578 AF	7,014 AF	12,592 AF
2003	6,154 AF	7,708 AF	13,862 AF
2004	6,706 AF	8,374 AF	15,081 AF
2005	7,237 AF	9,014 AF	16,251 AF
2006	7,747 AF	9,628 AF	17,375 AF
2007	8,236 AF	10,218 AF	18,454 AF

Figure F-9 Number of toilets installed each year to meet the coverage requirement

	Avg. Ann. Single Family Replacements (# of ULFTs)	Avg. Ann. Multi Family Replacements (# of ULFTs)	Avg. Ann. Single Family Savings (AF/Yr)	Avg. Ann. Multi Family Savings (AF/Yr)	Cumulative Savings (AF)	90% of Coverage Requirement (AF)*
1998	9,214	6,207	195	249	7,403	701
1999	18,893	13,908	586	796	10,281	2,021
2000	11,548	6,741	807	1,034	13,557	3,885
2001	8,423	3,784	952	1,144	17,031	6,224
2002	13,215	2,929	1,193	1,216	20,763	8,977
2003	5,168	3,510	1,255	1,308	24,596	12,087
2004	-	-	1,205	1,256	28,275	15,505
2005	-	-	1,156	1,205	31,808	19,183
2006	-	-	1,110	1,157	35,198	23,081
2007	-	-	1,066	1,111	38,454	27,162

* CUWCC requires meeting 90% of target to be considered in compliance with BMP

Appendix G

Best Management Practices

BMP 03 Coverage: System Water Audits, Leak Detection and Repair

Reporting Unit: **Santa Clara Valley Water District**

Reporting Period: **03-04**

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one of two conditions to be in compliance with BMP 3:

Condition 1: Perform a prescreening audit. If the result is equal to or greater than 0.9 nothing more needs be done.

Condition 2: Perform a prescreening audit. If the result is less than 0.9, perform a full audit in accordance with AWWA's Manual of Water Supply Practices, Water Audits, and Leak Detection.

Test for Conditions 1 and 2

Report Year	Report Period	Pre-Screen Completed	Pre-Screen Result	Full Audit Indicated	Full Audit Completed
1999	99-00	YES	99.5%	No	YES
2000	99-00	YES	101.2%	No	YES
2001	01-02	YES	98.3%	No	YES
2002	01-02	YES	99.1%	No	YES
2003	03-04	YES	102.3%	No	YES
2004	03-04	YES	97.9%	No	YES

BMP 3 COVERAGE STATUS SUMMARY:
Water supplier is meeting coverage requirements for this BMP.

BMP 07 Coverage: Public Information Programs

Reporting Unit: **Santa Clara Valley Water District**

Reporting Period: **03-04**

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?	No

An agency must meet one condition to comply with BMP 7.

Condition 1: Implement and maintain a public information program consistent with BMP 7's definition.

Test for Condition 1

Year	Report Period	BMP 7 Implementation Year	RU Has Public Information Program?
1999	99-00	2	YES
2000	99-00	3	YES
2001	01-02	4	YES
2002	01-02	5	YES
2003	03-04	6	YES
2004	03-04	7	YES

BMP 7 COVERAGE STATUS SUMMARY:
Water supplier is meeting coverage requirements for this BMP.

BMP 08 Coverage: School Education Programs

Reporting Unit: Reporting Period:

Santa Clara Valley Water District **03-04**

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? Yes

An agency must meet one condition to comply with BMP 8.

Condition 1: Implement and maintain a school education program consistent with BMP 8's definition.

Test for Condition 1

Year	Report Period	BMP 8 Implementation Year	RU Has School Education Program?
1999	99-00	2	YES
2000	99-00	3	YES
2001	01-02	4	YES
2002	01-02	5	YES
2003	03-04	6	YES
2004	03-04	7	YES

BMP 8 COVERAGE STATUS SUMMARY:
Water supplier is meeting coverage requirements for this BMP.

BMP 11 Coverage: Conservation Pricing

Reporting Unit: **Santa Clara Valley Water District**

Reporting Period: **03-04**

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

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An agency must meet one condition to comply with BMP 11.

Agency shall maintain rate structure consistent with BMP 11's definition of conservation pricing. Implementation methods shall be at least as effective as eliminating non-conserving pricing and adopting conserving pricing. For signatories supplying both water and sewer service, this BMP applies to pricing of both water and sewer service. Signatories that supply water but not sewer service shall make good faith efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.

a) Non-conserving pricing provides no incentives to customers to reduce use. Such pricing is characterized by one or more of the following components: rates in which the unit price decreases as the quantity used increases (declining block rates);rates that involve charging customers a fixed amount per billing cycle regardless of the quantity used; pricing in which the typical bill is determined by high fixed charges and low commodity charges.

b) Conservation pricing provides incentives to customers to reduce average or peak use, or both. Such pricing includes: rates designed to recover the cost of providing service; and billing for water and sewer service based on metered water use. Conservation pricing is also characterized by one or more of the following components: rates in which the unit rate is constant regardless of the quantity used (uniform rates) or increases as the quantity used increases (increasing block rates); seasonal rates or excess-use surcharges to reduce peak demands during summer months; rates based upon the longrun marginal cost or the cost of adding the next unit of capacity to the system.

Test for Condition 1

Year	Report Period	RU Employed Non Conserving Rate Structure	RU Meets BMP 11 Coverage Requirement
1999	99-00	NO	YES
2000	99-00	NO	YES
2001	01-02	NO	YES
2002	01-02	NO	YES
2003	03-04	NO	YES
2004	03-04	NO	YES

BMP 11 COVERAGE STATUS SUMMARY:
Water supplier is meeting coverage requirements for this BMP.

BMP 12 Coverage: Conservation Coordinator

Reporting Unit: **Santa Clara Valley Water District**

Reporting Period: **03-04**

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

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Agency shall staff and maintain the position of conservation coordinator and provide support staff as necessary.

Test for Compliance

Report Year	Report Period	Conservation Coordinator Position Staffed?	Total Staff on Team (incl. CC)
1999	99-00	YES	5
2000	99-00	YES	5
2001	01-02	YES	6
2002	01-02	YES	6
2003	03-04	YES	6
2004	03-04	YES	6

BMP 12 COVERAGE STATUS SUMMARY:
Water supplier is meeting coverage requirements for this BMP.

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